FEBRUARY, 1931 BULLETIN 255

AGRICULTURAL EXPERIMENT STATION

KANSAS STATE AGRICULTURAL COLLEGE
MANHATTAN, KANSAS

DAIRY FARM ORGANIZATION IN SOUTHEASTERN KANSAS

PRINTED BY KANSAS STATE PRINTING PLANT
B. P. WALKER, STATE PRINTER
TOPEKA 1931
13-6940

SUMMARY

1. Dairying has proved profitable on a number of farms in Bourbon county, Kansas.

2. The rough land and thin soil common to this section are adapted to hay and pasture. Corn and prairie hay have been the important crops and beef cattle or dual-purpose cattle the chief live stock. Only during the last 10 or 15 years has the dairy industry developed to any marked extent. Since 1918 dairying has been stimulated by the market for whole milk at the condensary in Fort Scott.

3. The dairy farms on which records were obtained had more legumes and more live stock than was typical for most farms of the area. The number of milk cows varied from six to 45.

4. Earnings depended on the size of the farm business, the effectiveness with which the enterprises were conducted, and the balance between crops and live stock.

5. For the two years, 1925 and 1926, operators' earnings ranged from $3,042 on the best farm for its most profitable year's business, down to a deficit of $404, allowing a charge of 5 per cent on the investment.

6. Earnings on the well-organized and efficiently operated farms on which records were obtained were consistently above the average of all of the farms.

7. The dairy farms had an average of 15 cows producing 220 pounds of butter fat per cow in 1926, ranging from 128 to 295 pounds. On some of these farms production could have been increased by heavier feeding. On others, production could be increased by obtaining cows having greater capacity for milk production. Most of the product was sold as whole milk.

8. Production averaged somewhat higher during the pasture season than during the feeding season. However, the higher-producing herds freshened in fall and winter, were fed some concentrates during the pasture season, and had a winter production at least equal to summer production.

9. A high average production per cow is essential to obtaining a profitable margin of value of product over feed cost.

10. Cattle other than milk cows, poultry, and hogs were minor enterprises on these farms.

11. Practically all farms depended on work horses for power. Horses other than work horses were unimportant.

12. The quantities of labor and materials used for crops were subject to considerable variation from farm to farm. Probable requirements were based upon estimates of fair efficiency in following approved practices adaptable to local conditions.

13. Methods of consistently successful farmers suggest opportunities for improving the farm business on other farms.

14. The system suggested for 160-acre farms would provide feed for 15 dairy cows. Corn, oats, alfalfa, and sweet clover would be produced. Lime and fertilizer would be necessary if legumes were included in the cropping system. Even with no increase in crop yields the suggested system would bring larger returns than the typical farm of the area.

15. With the usual price relations, dairying offers better opportunities in this area than hog raising.

16. A one-man, 80-acre farm would necessarily be more intensively operated than a 160-acre farm if an income sufficient for the needs of a family is to be obtained. An expansion of the business would be highly desirable.

17. While the organization suggested for 320-acre farms is similar to that for the 160-acre farm, 320-acre farms usually have a larger proportion of the farm in grass and carry more stock cattle than do smaller farms.

18. Each farm presents separate problems in organization and variations from the suggestions should be made to meet particular conditions. The organization of each farm must be planned to quite an extent by the manager of that particular farm. The most profitable combination of crops and live stock will depend on the ability of the operator with the different lines of production as well as on the adaptation of his land to the crops and pasture.

TABLE OF CONTENTS.

DAIRY FARM ORGANIZATION IN SOUTHEASTERN KANSAS[1]

J. A. HODGES, R. S. KIFER,[2] AND R. D. NICHOLS

INTRODUCTION

A detailed study of farms in Bourbon county, Kansas, in 1925 and 1926, shows that dairying has proved profitable on many farms in Southeastern Kansas. Yet there are many farms in this area on which dairying is not an important enterprise and it seems likely that the keeping of dairy cows would increase farm earnings on many of them. The purpose of this bulletin is to point out some of the most significant factors contributing to the success or failure of dairy farms in this section and to suggest systems of dairy farming which will prove more profitable than most farming systems now followed. An analysis of Bourbon county agriculture leading to these conclusions involves a study of the adaptability of crops and live stock to physical and economic conditions; the ascertaining of crop yields and live stock production to be expected under usual conditions, together with the usual relationships between these and the basic elements of cost; the estimating of price relationships which are most probable; and the choice and combination of the enterprises best fitted to furnish a well-balanced farm organization and most, likely to yield the highest continuous returns.

NATURE OF STUDY AND SOURCE OF DATA

The primary source of the data used in this bulletin was a detailed farm records and accounts study, made by the Department of Agricultural Economics of the Kansas Agricultural Experiment Station cooperating with the Bureau of Agricultural Economics, United States Department of Agriculture, of 21 farms for 1925 and 15 of the same farms for 1926, located in Bourbon county, Kansas. The farm records obtained show the inventory of farm property; a detailed record of cash income and expenses; the daily use of man labor, horse work, and machinery; the quantities of seed, other materials, and cash costs used in crop production, and the quantity

Acknowledgment.—The writers wish to acknowledge the assistance of Prof. R. I. Throckmorton, head of the Department of Agronomy, for suggestions on cropping systems and soil treatment, and of Prof. H. W. Cave, of the Department of Dairy Husbandry, for suggestions on the probable requirements of dairy cows and young dairy stock.

1. Contribution No. 64 from the Department of Agricultural Economics, Kansas Agricultural Experiment Station, in coöperation with the Division of Farm Management, Bureau of Agricultural Economics, United States Department of Agriculture.

2. Associate Agricultural Economist, Bureau of Agricultural Economics, United States Department of Agriculture.

of feed and materials used in the production of live stock. These detailed farm records were considered in connection with other available data; namely, the crop yields and live-stock production reported by the State Board of Agriculture and results of crop and live-stock experiments of the Agricultural Experiment Station, in arriving at estimates of the value of farm production and the amount of expenditures to be expected under usual farming conditions.

Data relative to the physical characteristics of the county and their effect on the systems of farming were drawn from soil maps of the area reports of the United States Weather Bureau and ob-

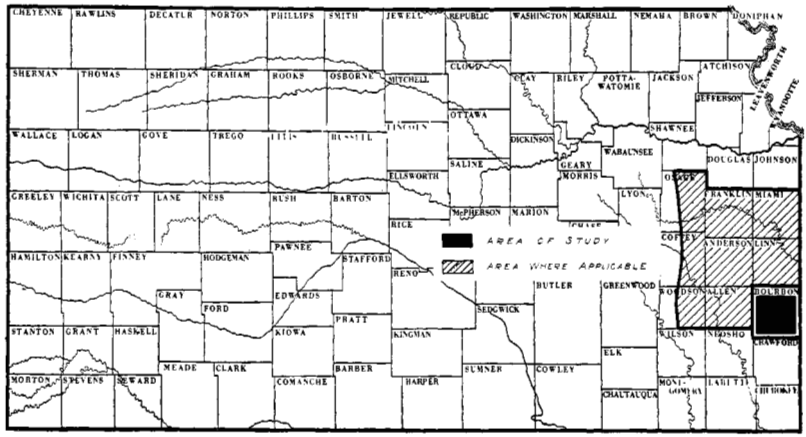

FIG. 1.—Map of Kansas showing the area to which the conclusions in this study are especially applicable.

servations of technical workers familiar with the section. The discussion of trends of production are based on reports of the United States census and the Kansas State Board of Agriculture.

DESCRIPTION OF AREA

Bourbon county is located on the eastern border of Kansas in the third tier of counties from the south. Data from this county are also applicable to the greater portion of the type-of-farming area consisting of the eight counties to the north and west. (Fig. 1) This area is characterized by the greater importance of corn, hay, and pasture as compared to wheat and other small grains. Dairying and poultry raising are the important live-stock enterprises.

The upland of the county is rolling. Its soil, which is a silt loam with a heavy subsoil, is residual from limestone, sandstone, and shale. Nearly all of the land that has been in cultivation is acid

and much is deficient in phosphorus. About 17 per cent of the county is bottom land, the soil of which is of the Osage and Verdigris series and is predominantly silt loam and silty clay loams. Some of the low land is subject to frequent overflow.

The average rainfall at Fort Scott for the 10-year period of 1915-1924 was 41 inches. Figure 2 shows the normal monthly distribution of rainfall and the distribution for 1923 and 1926. Normally two-thirds of the moisture falls during the season from April to September. In 1925, the first year of the study, the annual rainfall

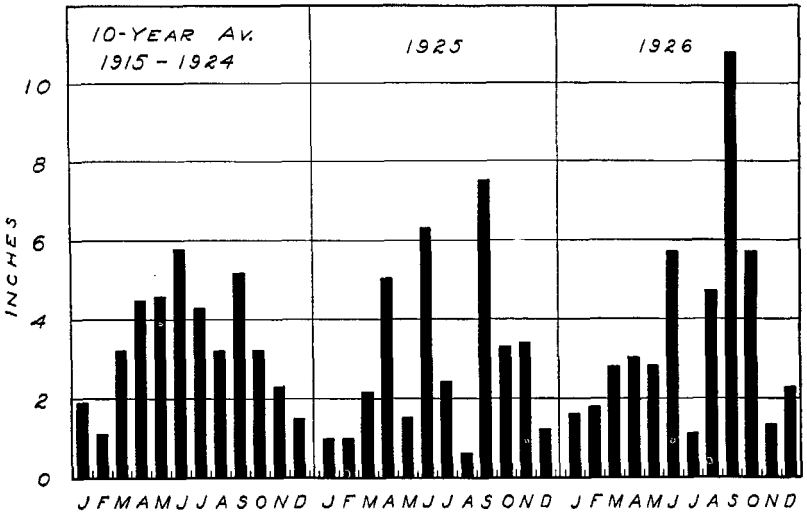

FIG. 2.—The monthly precipitation in 1925 and 1926 as compared with the 10-year average (1915-1924). The dry weather in August, 1925, reduced yields of row crops and made fall pastures short.

was more than 5 inches below the 10-year average. A drought in August and early September was especially injurious to pastures. In 1926, the second year of the study, the rainfall Was approximately 4 inches above the 10-year average.

Over a 10-year period the average length of the growing season was 185 days. The frost-free period was 196 days in length in 1925 and 188 daYs in 1926.

CROP ADAPTATION

The rough land and light soil common to this section is adapted to hay and pasture rather than to cultivated crops or small grain. Little wheat is grown in Bourbon county. The yield of corn is low compared to yields obtained in the corn belt, but is dependable.

Corn is the principal feed crop. Table I shows that in most years the acre yield of corn has been slightly higher than the yield of grain sorghums. However, the latter are usually grown on the poorer land. Grain sorghums and cane will yield more silage or roughage per acre than will corn. Kafir, on the upland and given the same cultivation as corn, will usually yield more grain, but on the bottom land larger yields from corn may be expected.[3] Oats is the most popular small grain crop, but the yields are low. Yields of alfalfa, as shown in the table, seem relatively higher than yields of other crops. This apparent advantage is due in part to the practice of seeding alfalfa only on the best land and is offset to some extent by the fact that much of the land must be limed if a good stand of alfalfa is secured. Sweet clover can be grown more readily than alfalfa on the poorer soils and is a good pasture and soil-improvement crop. The best results are secured by the application of lime. Soybeans can be grown for grain or forage. Sudan grass is a good pasture or hay crop.

MARKETS AND TRANSPORTATION

Fort Scott is the principal local market for the farm products of Bourbon county. Hard-surfaced roads leading out from the city in all directions make it possible for farmers to bring their products to market under any except the most adverse weather conditions. About 13 per cent of the farms of the county border on hard-surfaced roads and about 27 per cent on improved dirt roads. The county is served by three railroads which give it easy access to the larger terminal markets, particularly Kansas City and Wichita.

DEVELOPMENT OF PRESENT TYPE OF FARMING

Bourbon county was settled soon after 1854 and reached its fullest agricultural development during the decade from 1890 to 1900, the number of farms and the total acres of improved land being greater during that decade than at any other time. Since 1890 the farm population has been gradually decreasing.

On the whole, corn and prairie hay have been the important crops and beef cattle or dual-purpose cattle the chief live stock. Only during the last 10 to 15 years has the dairy industry developed to any marked extent.

3. Kansas Agricultural Experiment Station Bulletin 238.

TABLE I.—CROP YIELDS PER ACRE, BOURBON COUNTY, KANSAS, 1911-1926

YEAR.	Grain crops.				Forage crops.						
	Corn.	Wheat.	Oats.	Barley.	Kafir.	Milo.	Kafir.	Prairie hay.	Alfalfa.	Cane hay.	Sudan hay.
	Bus.	*Bus.*	*Bus.*	*Bus.*	*Bus.*	*Bus.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
1911	21	16	15	16							
1912	21	13	30								
1913	12	13	23	15							
1914	26	19	34								
1915	19	13	20		21	15	2.5	1.5	3.0	4.0	
1916	8	11	21		7	8	3.0	1.3	3.0	2.5	3.0
1917	26	20	37	25	18	16	3.0	.8	3.0	3.5	3.0
1918	7	18	24	20	8	10	2.8	.5	2.8	3.5	3.0
1919	23	15	29		21	21	3.0	1.3	3.3	4.4	3.0
1920	32	11	36	20	24	25	4.0	1.0	3.4	5.0	3.0
1921	26	12	16		27	25	3.0	1.4	2.5	5.0	3.0
1922	20	12	15		19	17	3.0	1.0	2.9	2.9	2.7
1923	15	9	24	10	12	12	3.5	1.0	2.5	3.0	2.3
1924	29	11	25	22	24	20	3.0	1.3	3.3	4.6	2.5
1925	20	13	24	15	19	15	2.6	.7	2.9	5.8	2.5
1926	23	18	23	20	26	24	5.0	1.0	2.4	4.7	2.5
Average	20	14	25	16	19	17	3.2	1.1	2.9	4.1	2.8

Source: Biennial reports of Kansas State Board of Agriculture.

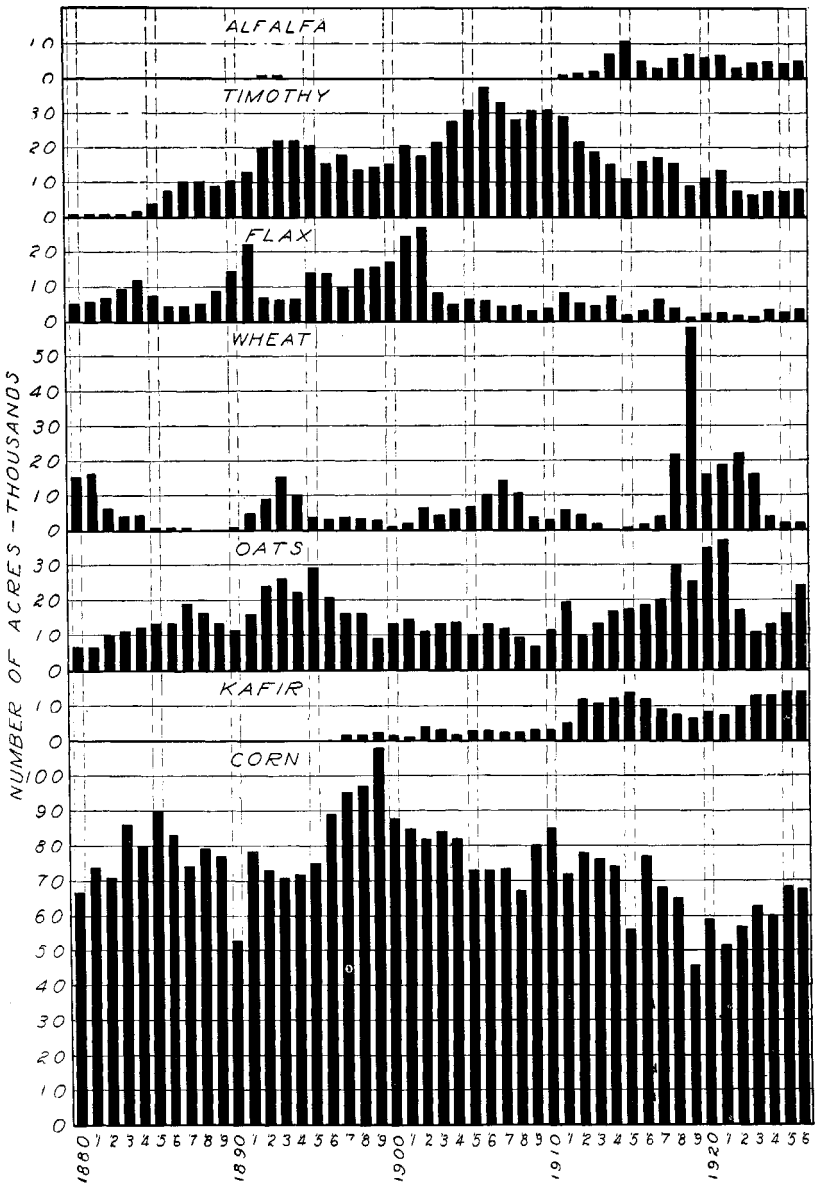

FIG. 3.—Acres in crops in Bourbon county from 1880 to 1926. Since 1920 corn and kafir have been increasing while wheat and timothy hay have been decreasing in acreage.

TREND OF CROP PRODUCTION

Corn has been the important grain crop since the section was first settled. Figure 3 shows the trend and fluctuations of the corn acreage during the period from 1880 to 1927. The acreage has tended to increase at those times when the farm population or the production of beef cattle and hogs was increasing. On the other hand, declines in corn acreage have accompanied decreases in farm population or increases in the acreage of small grain. Since 1919 the tendency has been to increase the corn acreage.

Grain sorghums have been increasing in importance during the past 25 years, and to some extent these crops are replacing corn in the cropping system. The kafir acreage was decreased temporarily in 1919 when the acreage of small grain was increased.

Wheat has been grown since the county was first settled, and during periods of favorable wheat prices the acreage usually has been expanded. In 1919 the acreage of wheat was greater than the acreage of corn, but by 1925 the acreage had decreased until little wheat was grown. An expansion of the wheat acreage in the past has meant a reduction in the acreage of corn and cultivated crops and the seeding of wheat in land not so well adapted to its production. Hence increases in wheat acreage have been accompanied by lower average yields.

Oats is grown primarily for a feed crop, yet the acreage has been increased materially in certain periods. Flax was an important crop until 1900. Since then the acreage has decreased and at present little flax is grown. At one time the production of sorgo (cane) for syrup was encouraged, but the acreage of this crop has never been large.

On most farms prairie or timothy hay continues to be the chief hay crop. Reports on the acreage of prairie hay are available only since 1915. Since then it has been one of the important crops on many farms. The acreage of timothy, or timothy and clover, has decreased since 1915. The acreage of alfalfa increased during the period from 1913 to 1921. But in spite of a demand for this type of hay, which accompanies an increase in dairying, the acreage has been decreasing during more recent years. Other legumes, of which sweet clover and soybeans are the most important, have been grown to a limited extent.

TREND OF LIVE-STOCK PRODUCTION

Beef cattle and milk cows have been kept to utilize the large acreage of pasture. In general, periods when numbers of cattle in the area were increased have corresponded with the periods of expansion of the cattle industry in the United States. The number of milk cows has been gradually increasing since 1905, and since 1918 dairying has been stimulated by the market for whole milk

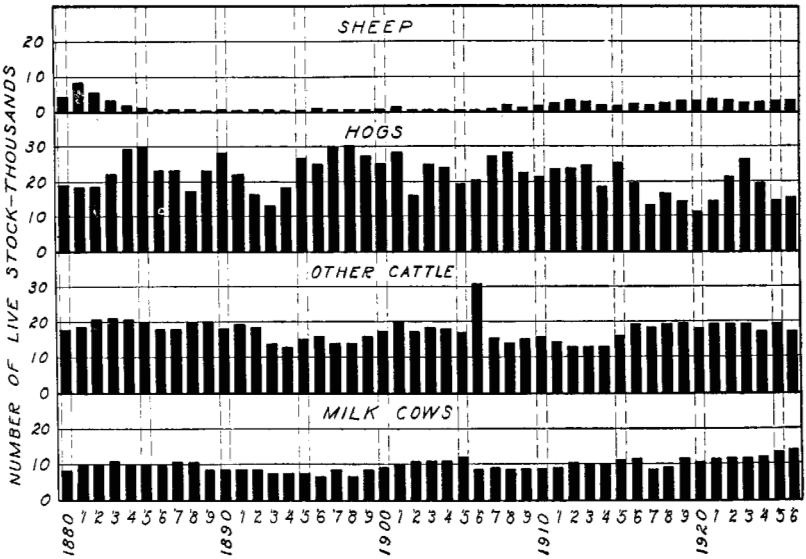

FIG. 4.—Numbers of live stock in Bourbon county from 1880 to 1926. The fluctuations in numbers have corresponded closely with changes in numbers in the United States. Minor changes have been due to local conditions.

at the condensary in Fort Scott. The year-to-year changes in the numbers of live stock in the county are shown in figure 4.

Expansion or reduction in the number of hogs has generally lagged one year behind variations in the corn crop, and following years of large corn production the numbers of hogs have increased. Decreases in numbers of cattle apparently made possible an expansion of pork production during the period of 1892 to 1900 and again during the period from 1906 to 1915.

Sheep were relatively important during the early development of the area, but at the present time few sheep are kept.

THE PRESENT TYPE OF FARMING

General rather than specialized farming is typical of this section. Corn, the most important grain crop, is grown on practically all farms. Kafir, milo, or feterita is grown on most farms either for grain or roughage. Oats is the principal small grain. Only about 14 per cent of the farms reported either flax or wheat. A few farms grow sorgo (cane) for syrup. In certain sections clover and timothy mixed or timothy alone is the important hay crop. In other sections prairie hay is the most important, and on some farms prairie hay is a major source of income. Alfalfa was reported on one-fourth of the farms while clover and soybeans were reported on only a few.[4]

DAIRY FARM ORGANIZATION

Detailed records were obtained from 21 Bourbon county farmers in 1925 and from 15 in 1926. These farmers received the major portion of their income from the sale of dairy products. Their farms were widely distributed about the county, and with respect to soil, climate, and marketing conditions were similar to many other farms of the county. Crop yields and live-stock production obtained on these particular farms can be duplicated on typical farms if the same practices are followed. These farms varied in size from less than 40 to more than 900 acres. About one-half of them had approximately 160 acres of land.

CROPS AND LIVE STOCK

The major crops on dairy farms were corn, kafir, and oats, but in addition legumes for hay and nonlegume feed crops were grown. Of the 15 farms on which records were kept in 1926, soybeans for seed or hay were grown on fire and alfalfa was grown on each of the remaining ten farms. Four of the farms had sweet clover for pasture. Nearly all of them had some timothy and clover mixed or timothy alone for hay. On the average, almost one-half of the land area on these farms was in prairie pasture.

In contrast to the typical farms in the county, none of the farms had less than six cow and nine of the 15 farms had more than 10 cows. The size of the dairy herds ranged from six to 45 cows.

4. This description is based on assessors' reports for 1926 of farms in five representative townships in the county. A more complete discussion of type of farming in this area is given in Kansas Agricultural Experiment Station Bulletin 251, "Types of Farming in Kansas."

Cattle, other than dairy cows, on these farms ranged from three to 16 live-stock units.[5] As a rule, enough young cattle were kept to replace losses in the milking herd. On some of the farms cattle were kept for beef production.

The crop acres on each farm, and to a certain extent the number and kind of live stock kept, depend on the acres of land suited only for pasture. Nearly all farms have some untillable pasture land on which cows or stock cattle are grazed. On farms typical of the section approximately one-third of the farm land is in prairie pasture. On some farms the native grass is supplemented with sweet clover for pasture.

The systems of farming followed may differ in certain localities as variations of soil and topography affect the adaptation of crops. Farms with a large grass acreage often carry beef cattle. On farms with a small grass acreage dairying is often more important. As a rule, however, the farms are not stocked heavily, although most farms have a few milk cows or beef cattle, hogs, and poultry.

For the section taken as a whole, dairying is the most important of the live-stock enterprises, yet but few farmers have gone into milk production on a large scale. Approximately 50 per cent of the 160-acre farms in five townships reported more than five cows in 1926, but only 12 per cent reported more than 10 cows. About 30 per cent of the 80-acre farms reported more than five cows and only 2 per cent reported more than 10. Nearly all farms larger than 200 acres reported more than five cows and about 25 per cent reported more than 10. On some farms pork production is more important than dairying.

There were twice as many poultry on these farms as on the typical farms of the county. About half of the dairy farms produced some pork, but on only one farm was pork production a major enterprise.

Horses were used for farm power on all farms and only two of the 16 farms did any significant amount of the field work with a tractor.

DISTRIBUTION OF INVESTMENT

The average investment on these dairy farms was $16,670, of which 74 per cent was in land and buildings and 16 per cent in live stock. The per cent of investment in live stock was larger on the dairy farms than on the general farms in the county. Ten

5. A live-stock unit as used in this bulletin consists of one mature cow or horse, one two-year-old heifer or steer, two young cattle, five hogs, 10 pigs, seven sheep, or 100 poultry.

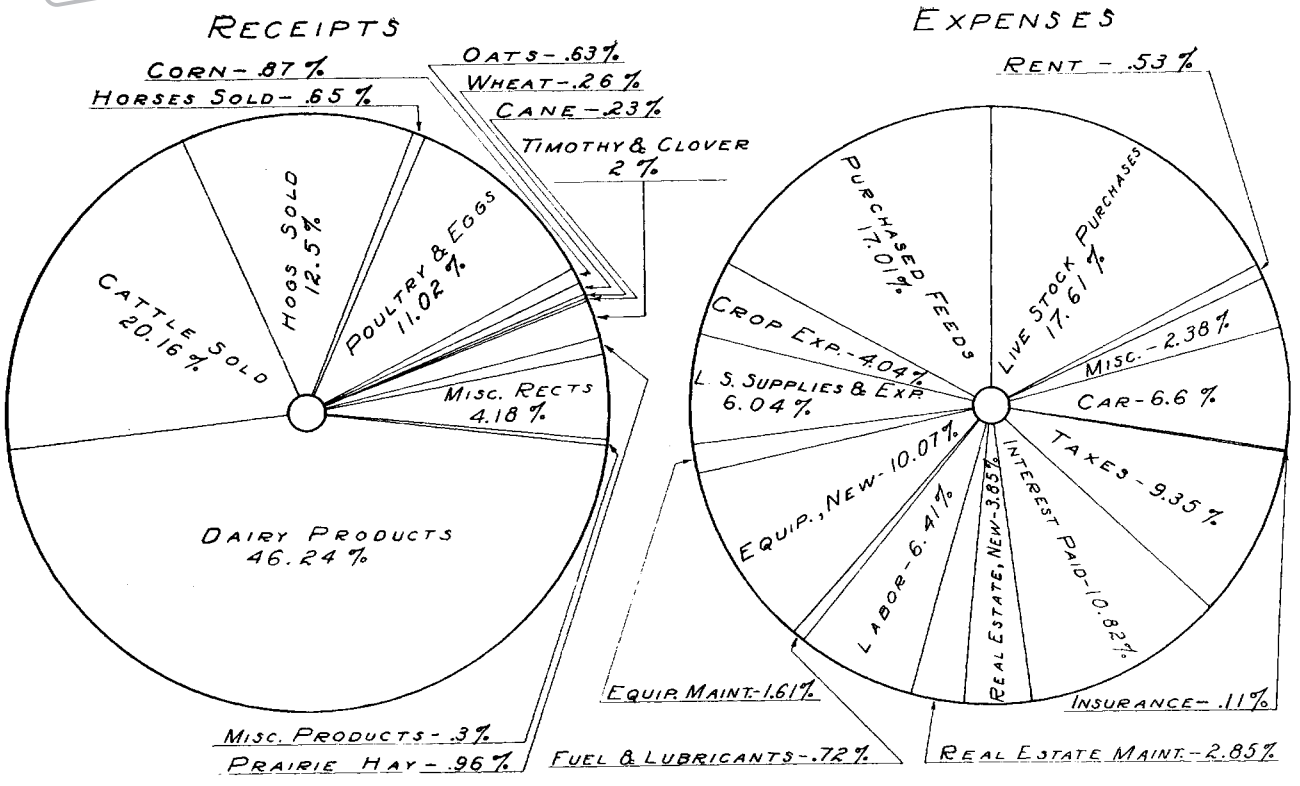

FIG. 5.—Distribution of receipts and expenses in 1926. Almost half of the receipts were from dairy products and about 90 per cent were from live stock and live-stock products. Purchases of feed and live stock were the most significant items of expense.

per cent of the investment was in equipment and supplies. The acre value of land without buildings was reported in 1926 at $36. The acre value for the county as reported by the census of 1925 was $39.13.

INCOME AND EXPENSES

The importance of dairying on the farms included in the study is shown by figure 5. Nearly one-half of the gross income in 1926 was from the sale of dairy products and if the value of live stock sold is added to the income from milk and cream: two-thirds of the receipts were from cattle. Only 5 per cent of the receipts were from crop sales. Similar data for the county as a whole are not available, but the typical farm would obtain a higher proportion of its receipts from the sale of crops and less from dairy products.

One of the largest item of expense on the dairy farms is for purchased feed. All farmers purchased protein supplements and many purchased some grain as well. Expenses for new equipment, live stock, and taxes are also important. Most of the work on these farms was done by the operator or by members of the family, so the average expense for hired labor was small.

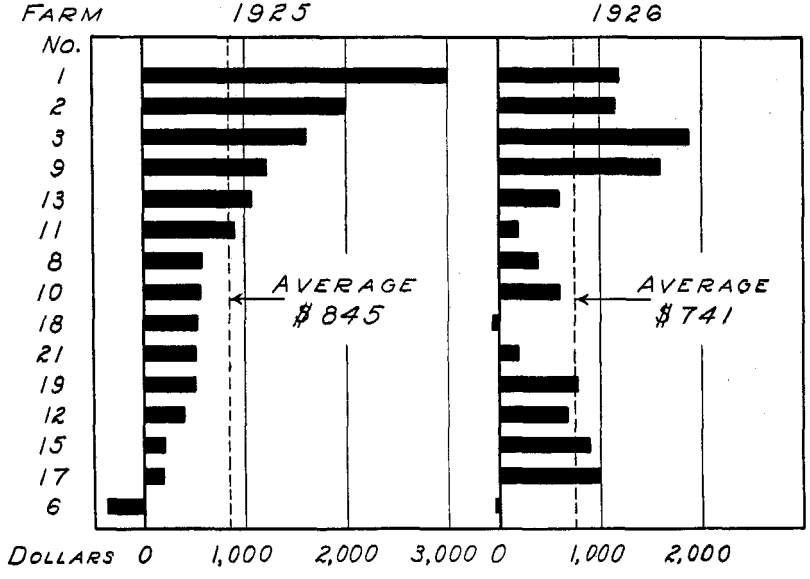

FIG. 6.—Variations in operators' earnings on 15 farms, Bourbon county, Kansas. Well-organized and efficiently operated farms usually will show consistent earnings over a period of years. However, particular circumstances may reduce the income some years even on the most carefully managed farms.

VARIATIONS IN EARNINGS ON FARMS

Operators' earnings[6] in 1926 averaged $741 on 15 owned farms. In 1925 the average operator's earnings were $845. Figure 6 shows a wide variation in earnings on different farms in each year and often a considerable variation on the same farm from one year to the other. Well-organized and efficiently operated farms usually will show consistent earnings over a period of years. However, particular circumstances may reduce the income some years even on the most carefully managed farms. In 1925 the most successful farm paid $3,042 to the operator in excess of expenses and interest charged on the farm investment, while the least successful farm not only failed to reward the operator but lacked $404 of paying expenses and meeting the interest charge. The range of operators' earnings in 1926 was from $1,904 to —$24.

The most obvious factors affecting farm incomes are:

1. Size of farm business.
2. Crop yields.
3. Production per unit of live stock.
4. Balance of crops and live stock on the farm.

Farm No. 1, the largest farm in the group, gave the highest operator's earnings in 1925 and was one of the most successful farms in 1926. The operator's earnings were lowest on farm No. 6. This farm was as large as the average and the production of the cows was above the average, but low crop yields were obtained each year. Farm No. 8 was a large farm and had a large herd, but the production per cow was low. The returns on this farm were below the average both years. Farm No. 17, with low returns in 1925, had an increased production per cow and increased earnings in 1926. Farm No. 18, with good crop yields and good live-stock production, had low operator's earnings because of a small farm and small herd.

FEED AND LABOR USED IN LIVE-STOCK PRODUCTION

Since a large proportion of the income was from live stock, farm profits depended largely on the success of these enterprises. Much of the difference in income between farms was due to differences in the way the live stock were handled and the efficiency with which feed and labor were used.

The average production, together with the feed used, cash costs incurred, and labor required, for the two years in which records were

6. The amount of operators' earnings is determined by adding the value of farm products used in the household to the excess of receipts over expenses and deducting a charge of 5 per cent on the invested capital exclusive of dwelling. The 5 per cent charge on land approximates the going rent.

obtained is shown in the tables which follow. Feed requirements for a given standard of production are also shown. These requirements, although they are not averages of the records, show the quantity of feed, material, and labor which under usual conditions should be sufficient to produce the designated quantity of live stock or live-stock products. These production relations are applicable to general conditions, and operators who are favorably situated may be able to produce live stock and live-stock products with less feed or labor than the quantities given. The quantities used are derived from a study of feed and materials used on the farms in which records were obtained and from practices recommended by the Kansas Agricultural Experiment Station. The live-stock rations as suggested use as much farm-grown feed as possible. The estimated labor required is applicable to conditions existing on typical farms in the section. The standard of efficiency assumed will give a production per unit which may be expected for a given amount of cost elements where reasonably good methods are used. While the efficiency is higher than that on some farms, this production for the amount of cost elements was equaled or surpassed on a number of farms from which records mere obtained.

Dairy Production

The dairy herds were made up primarily of grade Holstein or grade Shorthorn cows. The breeding of the cows on which records were obtained is as follows:

	Number.	Per cent of total.
Holstein	98	45
Shorthorn	49	22
Guernsey	34	16
Jersey	25	11
Mixed	13	6

Few of the cows were pure bred. Of the 219 cows on these farms in 1926, there were seven pure-bred Holsteins, eight pure-bred Guernseys, and one pure-bred Shorthorn cow.

Markets for both cream and whole milk were available. Prices obtained for butter fat in whole milk ranged somewhat above the prices for butter fat in cream. When cream is sold the skim milk is saved for feeding to other live stock. This makes it advisable for some producers to sell all or a part of their product as cream.

FEED USED IN DAIRY PRODUCTION

Table II shows the average quantity of feed, materials, and labor expended on each cow and the production obtained on 14 farms in 1926. Production ranged from 128 to 295 pounds of butter fat, with

TABLE II.—FEED AND LABOR USED PER COW IN PRODUCING BUTTER FAT, 1926

FARM NO.	Number of cows per farm.	Butter fat per cow.	Feed per cow.							Veterinary services and medicine.	Man labor.	Horse hours.
			Concentrates.			Roughage.			Pasture.			
			Grain.	High-protein.	Medium-protein.	Alfalfa.	Other dry roughage.	Silage.				
		Lbs.	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Days.*		*Hrs.*	*Hrs.*
12	11	295	587	130	799	838	1,641	6,908	170	$3.54	213	3
18	7	281	1,247	73	925	2,306	586	7,467	178	4.76	146	.....
17	8	279	1,245	223	.....	2,000	1,419	6,903	199	1.11	135	9
1	45	266	1,258	219	1,358	1,356	.....	6,044	205	1.17	49	4
3	23	258	1,313	192	83	1,348	522	6,565	215	.96	70	3
6	15	227	1,561	210	7	1,246	918	7,607	206	2.30	93	23
19	11	216	1,487	218	18	432	2,409	4,727	196	.....	166	15
15	10	210	2,110	361	.....	1,411	2,470	3,327	197	.15	178	14
21	6	209	1,319	458	33	2,273	2,744	6,518	183	1.29	120	6
11	10	202	2,721	224	122	605	5,443	.....	206	.10	176	30
2	29	187	950	324	886	893	657	3,910	205	.....	166	14
9	14	152	86	29	.....	582	4,545	291	200	.04	82	7
13	6	151	339	17	17	676	1,014	5,574	208	.08	136	1
8	24	128	612	38	.....	507	1,479	7,309	169	.26	147	14
Average:												
219 cows, 1926	.....	220	1,156	197	487	1,098	1,386	5,354	198	.95	119	10
273 cows, 1925	.....	218	1,011	200	262	1,793	1,835	5,430	137	.77	152	12
Probable requirements for production assumed	.....	250	1,150	250	300	2,500	750	6,500	160	.75	120	10

an average of 220 pounds per cow. On some of these farms production could have been increased by heavier feeding. On others the production could be increased by obtaining cows having greater capacity for milk production.

High production cannot be obtained without good feeding and good herd management. Not only was a greater quantity of feed given to the high-producing herds, but the ration carried a higher per cent of protein. In general, the highest-producing herds received a more liberal grain ration, more alfalfa, more silage, and less timothy, prarie hay, or fodder than the low-producing herds.

The usual grain ration consisted of corn and cob meal, ground corn, or oats. On the average 72 per cent of the grain was corn and 27 per cent oats. Some kafir was fed to cows. High-protein feed consisted of cottonseed meal, linseed oil meal, and in a few cases ground soybeans. Mill feeds, such as bran, shorts, and, occasionally, prepared dairy feed, were fed.

All of the 14 herds were fed some alfalfa, soybean, or sweet clover hay. All herds except one were fed some dry roughage other than legume hay. On the average the quantity of alfalfa hay fed was less than the average quantity of roughage such as clover and timothy, crab grass, kafir, and corn stover. Silage was fed on 12 of the 14 farms.

All herds were on pasture during the summer, the time on pasture on different farms ranging from 169 to 215 days. Native grass constituted 93 per cent of the pasture acreage, with timothy and clover, small grain stubble, Sudan grass, and sweet clover used in particular instances. The prairie pastures usually are good during the spring and fall months, but often require supplementary feed if milk production is maintained during the summer.

SUMMER AND WINTER PRODUCTION

Production during the pasture months, May to October inclusive, averaged 116 pounds of butter fat per cow as compared to 104 pounds during the winter. All herds except the three with the lowest production were fed some grain during the summer and most herds. received silage or alfalfa.[7] The five herds with the highest production received grain and silage while the cows were on pasture and three of these herds received alfalfa in addition.

In general, the herds with a high summer production had a high winter production as well and there was little difference between

7. Appendix, Table No. XXIII.

the butter-fat production per cow in summer and winter. Herds with a low annual production produced a larger per cent of the milk during the summer months.

On these farms annual milk production is closely associated with the winter milk production, and to obtain this high winter production the cows must freshen in the fall or winter. On the three farms with highest average production per cow, more than 50 per cent of the cows freshened during the quarter from December to February. The time of freshening of all cows in the study was as follows:

	Number.	Per cent.
March to May, inclusive..	58	29
June to August, inclusive..	30	15
September to October, inclusive..	39	19
December to February: inclusive..		37

MARGIN OVER FEED COST

High annual production is necessary to obtain a good margin of profit. Table III shows the margin over feed cost, per cow and per pound of butter fat in herds with low and high production. The margin of $27.37 above feed cost for the group of cows averaging 137 pounds of butter fat can be compared with a margin of $91.38 for the group averaging 291 pounds of butter fat. Not only the

TABLE III.—THE RELATION OF PRODUCTION OF BUTTER FAT PER COW TO THE VALUE OF PRODUCTION, FEED COST, AND MARGIN OF VALUE OF PRODUCTION OVER FEED COST

PRODUCTION GROUP.	Number of herds (a).	Average B. F. production.	Per cow.			Per lb. of B. F.		
			Value of production.	Feed cost.	Margin.	Value of production.	Feed cost.	Margin.
		Lbs.						
110-159 lbs.	5	137	$66.68	$39.31	$27.37	$0.49	$0.29	$0.20
160-209 lbs.	11	185	94.52	49.36	45.16	.51	.27	.24
210-259 lbs.	9	235	121.55	57.80	63.75	.52	.25	.27
260 lbs. and over	8	291	163.00	71.62	91.38	.56	.25	.31

(a) Average for 1925 and 1926.

margin per cow was increased but also the margin per pound of butter fat. This increase in margin per pound of butter fat was due partly to a decrease in the cost of feed and partly to an increase in the value of butter fat. Part of the latter was caused by a premium which some farmers received for higher butter fat content or by some special sales arrangement. In the higher group, also, a larger per cent of the production was sold in the winter season of higher

prices. As a general rule those selling milk received more per pound of butter fat than those selling cream, even when the value of the skim milk reported fed was considered.

PROBABLE FEED REQUIREMENTS

The probable production which should be obtained if the feeds suggested in Table II are fed was exceeded by five of the 14 farms in 1926. These particular farms included in the table are more highly specialized in dairying than are the typical farms in the county, and it is not likely that a large percent of the farmers in this section could readily exceed the assumed production standard. The feed allowance is sufficient for practically one pound of grain for each four pounds of 3½ per cent milk and provides alfalfa hay and silage to feed a 1,100-pound cow for a longer period than the usual feeding season. Compared to the average quantity of feed actually used on the farms, the suggested feed requirements for a milk production slightly above the average, call for approximately the same quantity of grain, but more high-protein feeds, such as cottonseed meal, and less of bran and other low-protein concentrates. More alfalfa, more silage, and less mixed hay and stover are suggested.

Since good dairymen feed according to the production of their herds, and since herds differ in their ability to convert feed into milk, Table IV shows the approximate quantity of feed which will be used by cows producing different quantities of butter fat. In budgeting feed and labor for the dairy herd the capacity of the

TABLE IV.—ESTIMATED ANNUAL FEED REQUIREMENTS FOR COWS PRODUCING DIFFERENT QUANTITIES OF BUTTER FAT

FEED.	Pounds of feed for cows producing.				
	200 lbs. B. F.	225 lbs. B. F.	250 lbs. B. F.	275 lbs. B. F.	300 lbs. B. F.
Corn and cob meal	750	750	850	950	1,100
Oats	250	250	300	300	300
Bran	200	300	300	400	400
Cottonseed meal	100	200	250	250	300
Alfalfa	3,500	2,500	2,500	2,500	2,500
Clover and timothy	1,000	500	750	.....	.....
Stover	500	500	.....	.....	.....
Silage	.....	6,000	6,500	7,500	7,500

cows on hand and the feed available must be taken into consideration.

CASH COSTS

Feed and labor are the largest items of expense in milk production, but other items of expense are necessarily incurred. The average expenditures for medicine, veterinary fees, and disinfectants per cow in the herds on which records were kept are given in Table II. On some herds none of these expenses were incurred, while on others the cost was as high as $4.76 per cow. Due to a few farms with high costs, the average in 1926 was 95 cents. In 1925 the cost per cow was 77 cents.

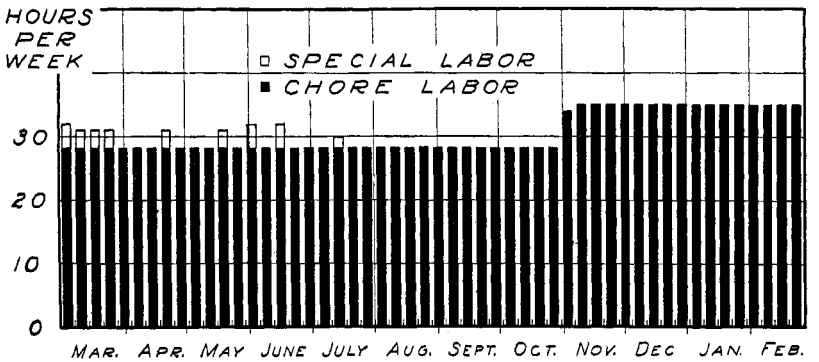

FIG. 7.—Distribution of man labor by weeks on 23 dairy cows. Labor on dairy cows is fairly evenly distributed throughout the year, but tends to be heavier during the winter months. This is especially true when the cows freshen in the fall.

Herds of pure-bred stock will usually require some registration fees. Five of the 14 farm operators were members of the cow-testing association, with membership dues of $44 annually. Most of the farmers selling whole milk hire their milk hauled, the rate of payment depending on the distance from the condensary. The charge for milk hauling varied from 20 to 35 cents per hundredweight, and was the largest single item of cash costs.

LABOR ON DAIRY COWS

The variation from 49 hours to 213 hours in man labor per cow was due to a number of causes. Farmers who did their own milk hauling tended to use more labor than those who hired the milk hauled. These farmers had lower cash expenditures. The average quantity of labor spent on each cow tended to be higher in small than in large herds. Where cream was sold the work of separating

tended to increase the labor, but cream hauling did not require a great deal of time. Herds with a heavy winter production may require more labor than herds with a light production in winter and a heavy production in summer.

It requires but little more labor to care for a herd of high-producing cows than for a herd of low producers. More significant than production per cow or quantity of feed given, so far as labor per cow is concerned, is the method of feeding, arrangement of barns and feed rooms, use of mechanical equipment in milking and handling the milk, and effectiveness of the individual workers.

Figure 7 shows the distribution of labor on cows by weeks. On the farm from which this record was taken there were more calves born during the fall and winter than during the spring months. This labor distribution illustrates the seasonal use of labor on well-managed dairy farms where whole milk is collected at the farm by a milk truck and sold to the condensary. Little horse work was used in caring for the dairy cows.

Cattle Other Than Milk Cows

In addition to the milk cows the dairy herd on all farms contained some young dairy cattle and on most farms a herd bull. The number of other cattle on the farms varied from a few growing heifers for replacing milk cows to herds of young cattle containing more animal units than the dairy herd. The number of young cattle is often limited by the acreage of pasture available. On two farms from which records were obtained yearling cattle were purchased to pasture through the summer and were fed out during the winter.

The herds included in Table V consisted primarily of young cattle raised on the farm and are typical of the herds of young stock on dairy farms of the county. These herds were made up of a total of nine bulls, four stock cows, 40 two-year-olds, 49 yearlings, and 35 calves. The feed which was given calves, young stock, and bulls was reported together. The number of live-stock units ranged from three to 46, with an average of 10.5 per farm.

The production per live-stock unit shows a wide variation. This is due partly to the fact that no account was taken of birth or death weights. The higher the proportion of calves, the higher the production per live-stock unit appears. This comes both from the fact of not allowing birth weight for calves and the fact that a live-stock unit of calves normally makes higher gains than a live-stock unit composed of more mature animals.

Much of the variation in feed on different farms was due to different proportions of the classes of cattle in the herds. The concentrates fed consisted of corn and corn chop although shorts and bran were fed in small quantities on five of the farms. On five farms no grain or protein concentrates were fed. Alfalfa was fed on 11 farms and silage on 10. All farms except one fed whole milk to calves, but only four fed skim milk. On those farms where skim milk was fed in large quantities little whole milk was fed to calves.

The probable feed requirements suggested for cattle other than milk cows are suited to a herd consisting of a herd bull, four two-year-old heifers, five yearlings, six calves kept in the herd and six sold for veal. A herd of this kind would be similar to those commonly kept on dairy farms. Compared to the average quantity of feed used on the 13 farms the suggested requirements call for more grain and protein concentrates but for approximately the same quantity and kind of roughage. The use of less whole milk than is commonly used per unit and more skim milk is suggested.

A herd of this size and made up of the same classes of stock should allow each year five heifers for sale or for replacement of cows in the dairy herd. Approximately six veals would be sold annually. If more calves were kept in the herd the quantity of whole milk required in growing veal calves would be reduced and the necessary quantity of skim milk increased.

Calves for veal are usually fed whole milk until they are sold at the age of five or six weeks. Calves to be kept on the farm may be fed largely on skim milk and calf meal. When milk testing 3.8 per cent is worth $1.80 per hundredweight on the farm, calves fed an average of 13.5 pounds of milk daily for six weeks will have consumed milk valued at approximately $10.20. At this price only good-sized veals which are strong and thrifty will return a good profit on the milk given.

Veterinary expenses, registration fees, shipping and trucking expenses, feed grinding, and salt make up the items included in cash expense.

Young stock on pasture require little attention and the man labor per live-stock unit averaged only 22 hours in 1926. Variations from nine to 60 hours came from differences in the composition of the herd, the method of feeding, and equipment for caring for the stock.

The distribution of man labor on cattle by weeks is shown in figure 8. This labor record is taken from a herd similar to that on

TABLE V.—FEED AND LABOR USED PER LIVE-STOCK UNIT BY CATTLE OTHER THAN MILK COWS, 1926

FARM NO.	Live-stock units.	Production of beef.	Feed per live-stock unit.							Pasture	Cash costs.	Man labor.	Horse work.
			Concentrates.		Roughage.			Milk.					
			Grain.	Protein feed.	Alfalfa.	Other dry feed.	Silage.	Whole.	Skim.				
		Lbs.	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Days.*		*Hrs.*	*Hrs.*
1	46.24	341	12	22	837	454	2,941	881	.....	239	$0.17	60	28
9	13.50	757	.....	.....	259	3,296	.....	.....	2,263	183	2.22	17	.....
3	11.79	670	398	16	891	1,145	5,173	1,397	.....	182	.70	20	.....
13	11.38	585	.....	.....	440	1,626	5,802	298	278	195	.40	9	1
8	9.87	514	.....	.....	.....	1,722	5,266	50	.....	246	.20	20	8
15	9.37	563	14	.....	427	1,881	4,054	209	1,786	188	.19	31	11
10	6.67	610	25	.....	645	5,251	.....	2,143	.....	117	.....	48	30
11	6.58	515	489	.....	228	5,849	.....	1,785	.....	147	2.81	54	27
17	5.33	615	115	34	281	4,724	3,937	1,370	.....	173	.09	27	2
19	4.96	611	.....	.....	.....	1,311	4,841	2,130	.....	147	.10	56	16
6	4.88	753	.....	.....	102	1,639	9,016	1,849	.....	139	.18	59	6
18	3.67	687	1,130	90	3,068	.....	7,363	1,039	.....	169	4.50	58	.....
12	2.75	754	179	100	182	2,186	5,100	1,823	188	125	.....	28	2
Average:													
137 L. U., 1926	.....	533	102	15	593	1,876	3,526	917	372	198	.67	22	6
200 L. U., 1925	.....	626	115	14	804	3,125	4,860	624	924	155	.25	32	7
Probable requirements for production:													
With silage	.....	.....	500	100	750	2,000	4,000	450	625	180	.50	25	7
Without silage	.....	.....	500	100	1,000	3,000	.....	450	625	180	.50	25	7

which the probable feed requirements for a herd of young cattle are based and should be representative of the labor on young cattle at different seasons of the year.

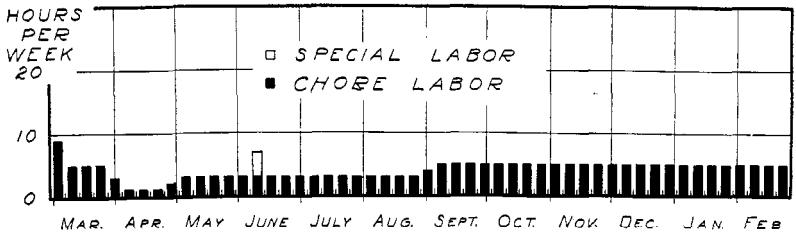

FIG. 8.—Distribution of man labor by weeks on twelve live-stock units of cattle other than dairy cows. Young dairy cattle require a relatively small proportion of the total labor for the herd.

Poultry

There is an opportunity to increase the profits from the poultry enterprise on many farms either by keeping larger flocks or through increasing unit production. Table VI shows the variation in number of hens and the range in production for 14 farms in 1926. On the average, larger flocks were kept on these farms than on typical farms in the county. On these farms the number of hens ranged from 45 to 404 with an average of 150 per farm. The eggs produced per hen ranged from 45 to 132 a year with an average of 87. The flocks on which records were available were apparently given more care and were much more productive than most farm flocks in the county. A typical flock in the county would consist of 60 to 80 hens and according to the census report for 1924 produced an average of 52 eggs per hen.

Dual purpose breeds for both eggs and meat are kept on most farms. The breeds of poultry included in the table are as follows:

Breed.	Number of flocks.
Plymouth Rock	4
Buff Orpington	3
Rhode Island Reds	3
White Leghorns	2
Mixed	2

Some flocks produced eggs and little poultry while two farms made a particular point of raising broilers.

A small flock will pick up a large part of its feed about the farm, but to obtain high production of eggs or meat, liberal feeding and careful attention are required. The grain fed on these farms, as shown in Table VI, consisted primarily of corn and kafir, with a

TABLE VI.—FEED AND LABOR USED PER 100 HENS IN POULTRY AND EGG PRODUCTION, 1926

FARM NO.	Number of hens.	Production per 100 hens.		Feed per 100 hens.					Medicine and disinfectant.	Man labor.	Horse work.
		Eggs.	Poultry.	Grain.	Mill feed.	Meat scrap.	Skim milk.	Grits.			
		Number.	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*		*Hrs.*	*Hrs.*
21	404	13,246	407	5,919	1,751	510	783	173	$0.48	379	36
18	48	11,808	514	5,992	1,667	2,188	.....	52	.....	831	.....
17	65	11,404	827	13,855	1,163	539	.....	154	.....	794	101
11	207	11,021	100	9,874	338	133	.....	193	.72	307	11
10	160	8,779	46	7,309	.....	.....	.....	.....	.....	227	.....
1	173	8,652	1,393	21,482	1,487	58	1,147	.....	2.75	594	5
6	214	7,773	683	7,576	850	187	370	140	.....	526	42
2	147	7,098	439	5,256	1,024	.....	4,309	341	.....	358	.....
12	45	6,876	437	9,705	458	.....	.....	112	1.68	511	.....
13	150	6,496	337	6,338	1,965	.....	.....	131	.....	309	.....
8	60	6,368	85	7,677	167	.....	.....	.....	3.09	1,187	1
9	107	5,404	539	7,821	656	.....	7,386	.....	3.05	320	.....
19	198	5,196	244	6,317	529	25	.....	.....	2.27	354	.....
3	128	4,474	190	3,719	.....	.....	101	.....	.....	182	.....
Average:											
2,105 hens, 1926	.....	8,736	449	8,532	959	204	962	108	.98	418	16
3,022 hens, 1925	.....	9,715	592	7,110	1,132	258	1,915	98	1.61	316	16
Probable requirements for production	.....	10,000	500	7,000	1,000	500	1,000	100	1.00	350	16

small quantity of oats and wheat. A part of the grain was ground and fed as a portion of the mash. All but two farms fed mill feed, such as bran, shorts, prepared mash, or chick feed. Seven flocks were fed meat scrap or tankage. On three farms skim milk was fed in addition to meat scrap, while on two others which fed skim milk heavily no other animal protein feed was given. The array of farms indicates that the highest-producing flocks were fed liberal, balanced rations. No effort was made to keep the feed of hens and young poultry separate.

The quantity of feed estimated as required for 100 hens is also given in Table VI. This quantity of feed assumes a production of 100 eggs and five pounds of poultry per hen. While this production is slightly above the average for the 14 farms in 1926, four flocks produced more eggs and five produced more poultry per hen. The quantity and kind of feed required depends on the relative production of meat and eggs. With the dual-purpose breeds some operators obtained a high egg production and a heavy production of meat as well. These flocks required more feed per hen than flocks producing eggs primarily, or flocks having a low production of both eggs and young fowls.

The poultry ration, as given for the probable feed requirements, calls for approximately the average quantity of grain and mash, but for more than the average quantity of animal protein. Flocks of higher production, producing either more than the given quantity of meat or eggs, would require a still greater allowance of feed.

The period of heaviest egg production on these farms was during March, April, May, and June. In 1926, 60 per cent of the eggs were produced during these months. The months of lowest egg production were October, November, and December. (See Appendix, Table No. XXVIII.) The months of heaviest grain feeding were, of course, the months from April to October, when the young chicks were growing. Meat scrap was fed most heavily during the winter months, but much of the reduction in meat scrap fed during the summer was due to a greater use of skim milk at that time for young chicks.

Success with the poultry enterprise depends on proper breeding, good housing, intelligent culling, good feeding, sanitation, and parasite control. There is a close relation between egg production per hen and returns to the poultry enterprise. The meat produced does not show this close relationship, and this is to be expected,

since the value of the eggs produced is more than double the value of poultry on most farms.

The poultry enterprise requires the most labor during the spring and summer months, when young chicks must be cared for. Figure 9 shows the labor distribution on the poultry enterprise for one farm which had good equipment and housing. The average labor reported per 100 hens in 1926 ranged from 182 to 1,187 hours for the year, with an average of 418 hours. In general, the labor per hen is less for large than for small flocks, but the time required to care for the poultry depends largely on the equipment and

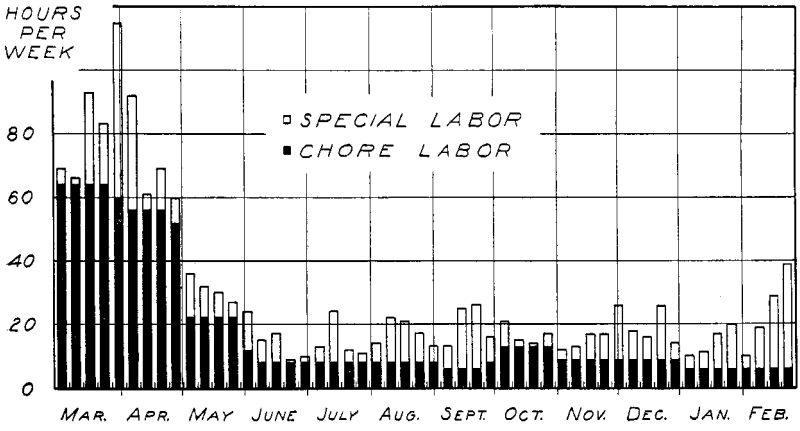

FIG. 9.—Distribution of man labor by weeks on 400 head of poultry. The poultry enterprise makes heavy demands upon labor during the hatching and brooding season.

facilities available. Equipment to care for poultry is likely to be better on farms with large flocks than on farms with only a few chickens, but farmers with large flocks are likely to give the poultry better care. The farm with the highest labor requirements had a small flock with poor facilities for handling it, while the farm reporting the least labor gave little care to the flock and secured the lowest production.

Hogs

Grain was used largely for dairy cows and where whole milk was sold pork production had a minor place in the farm organization. Only nine of the 15 farms fed any hogs in 1926. The production on these farms ranged from 702 to 15,775 pounds of pork for each farm. The three farms which produced more than 5,000 pounds of pork in 1926 sold cream for at least a part of the time and supple-

TABLE VII.—FEED AND LABOR USED IN PRODUCING 100 POUNDS OF PORK, 1926

FARM NO.	Pork production.	Feed per 100 pounds of pork.					Cash costs.	Man labor.	Horse work.
		Grain.	Mill feed.	Tankage.	Skim milk.	Pasture, L. S. U.			
	Lbs.	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Days.*		*Hrs.*	*Hrs.*
13	6,589	247	13	2	256			4	
15	1,230	378	14	6	520		$0.47	10	
19	1,778	380	17	20	49			5	
11	702	407	75	7			.64	16	
2	15,775	417	1		273	8	.18	3	1
9	6,765	486	27	9	385		.44	3	
21	4,584	533	44	23			.05	7	2
1	2,294	552					.47	3	
8	1,525	591						7	
Weighted av.:									
1926	4,582	425	14	5	226	3	.20	4	1
1925	3,236	313	9	5	273	4	.12	4	1
Probable requirements for production		375	15	5	225	10	.10	4	1

mented the grain ration for hogs with skim milk. Only one farm reported pasture for hogs.

Table VII shows the feed and labor used in pork production on these farms. On the average it required 425 pounds of grain, 14 pounds of mill feeds, and five pounds of tankage to produce 100 pounds of pork in 1926.

Low feed requirements for farms with a small pork production may be due to unmeasured waste feed picked up by the hogs and to the fact that some of these hogs were purchased as pigs and the feed for maintenance of breeding stock which produced them was not included. Cash costs averaged 20 cents per 100 pounds in 1926.

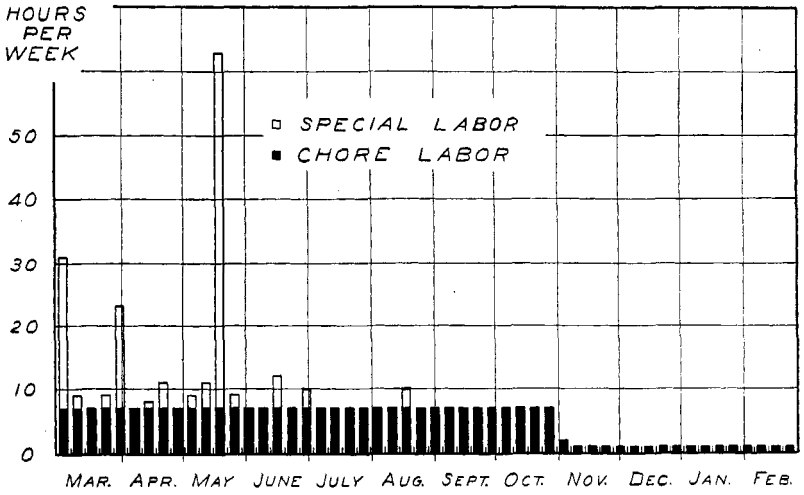

FIG. 10.—Distribution of man labor by weeks on hogs. This herd was made up of six sows, one boar, and 54 spring pigs.

In giving the probable feed requirements for pork production it. is assumed that one sow will produce at least one litter of pigs per year and that the pigs will be fed to weigh approximately 200 pounds each. In 1926 only one man produced pork with less than the grain requirements assumed. In 1925, nine of 14 farmers reporting hogs obtained a higher production for feed used than that indicated by the probable feed requirements. The use of alfalfa pasture and skim milk will help to reduce the necessary quantity of grain materially, and on farms which make a practice of selling cream, pork production may be a profitable enterprise.

With suitable facilities for handling hogs, pork production requires little man labor and for this reason may find a place on farms with a limited supply of labor.

Figure 10 gives the distribution of labor on hogs by weeks. The farm from which this distribution was taken provided pasture for hogs, and most of the pigs were spring farrowed.

Work Horses

Practically all of the field work on these farms was done with horses. Tractor work was reported on only two of the farms.

The number of work horses per farm ranged from two on a farm with only 15 acres in crops to eight on a farm with 312 acres. The number of crop acres for each horse varied from eight to 39 and was generally higher on farms with large crop acreages. The large farms offered a better opportunity for the use of large teams and larger units of machinery than did small farms.

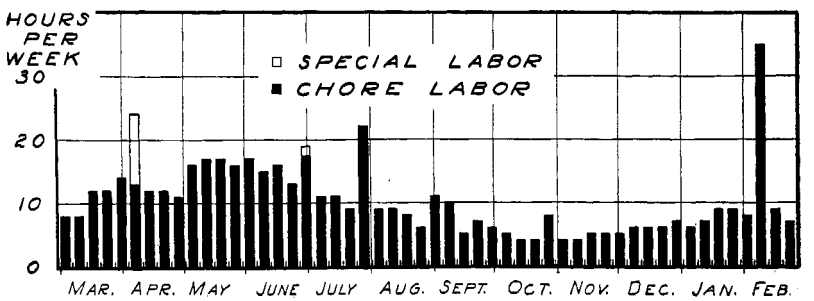

FIG. 11.—Distribution of man labor by weeks on six work horses. The heaviest demand for labor in caring for work horses comes during the cropping season.

Table VIII shows the number of work horses, the hours worked, and the feed and labor used on 15 farms in 1926. The quantity of grain fed each horse was related more directly to the hours worked per horse than to the crop acres per horse. Some horses were used for working roads or doing other work off the farm and some farms used much more horse work per acre than others.

The probable feed requirements given for a horse calls for more grain than was used on the average, and slightly less hay. It should provide feed for horses weighing approximately 1,300 pounds and doing about 1,000 hours of work during the year.

Cash costs, except on farms reporting veterinary fees or on which the horses were shod, were small.

The hours of man labor required to care for each horse is affected by the amount of work done and by the number of horses kept. Figure II shows the distribution of labor on one farm which is typical of farms in this section. The labor on horses was heaviest in May and June when the crop work was greatest.

TABLE VIII.—FEED AND LABOR USED PER HEAD FOR WORK HORSES, 1926

FARM NO.	Number of horses.	Work done per horse.	Feed per horse.					Cash costs.	Man labor per horse.	Horse work.
			Grain.	Hay.	Straw and fodder.	Silage.	Pasture.			
		Hrs.	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Days.*		*Hrs.*	*Hrs.*
1	8	1,255	3,919	4,469	.....	.....	169	$0.37	79	.....
6	5	931	2,288	3,600	3,300	.....	171	.45	95	.....
8	6	924	3,301	2,333	4,000	1,667	157	3.05	60	1
19	4	904	2,807	4,188	2,500	500	155	.10	89	.....
10	4	893	1,561	1,750	3,000	.....	183	.....	67	4
21	6	854	3,529	7,250	1,833	.....	130	1.27	94	4
11	5	789	2,806	3,800	3,200	.....	145	1.27	140	.....
17	5	700	2,859	5,028	828	621	160	.09	50	.....
15	5	698	2,163	4,600	3,150	1,100	136	.09	64	.....
2	7	670	3,677	2,715	.....	.....	209	.08	51	.....
12	2	646	2,979	5,450	4,250	.....	136	.....	80	.....
3	3	513	3,109	2,666	2,667	667	203	.72	61	3
9	6	470	617	2,500	3,334	.....	167	.03	27	.....
13	3	426	1,858	4,200	750	2,100	187	3.15	73	.....
18	2	325	1,526	6,750	.....	1,000	183	.....	46	.....
Average:										
71 horses, 1926	.....	782	2,720	3,956	2,091	444	166	.73	72	1
96 horses, 1925	.....	847	2,450	4,247	2,618	645	113	.47	72	8
Probable requirements for work horses	.....	1,000	3,000	3,500	1,500	.....	150	.75	70	10

TABLE IX.—FEED AND LABOR USED PER LIVE-STOCK UNIT BY HORSES OTHER THAN WORK HORSES, 1926

FARM NO.	Number of live-stock units.	Feed per live-stock unit.					Cash costs.	Man labor.	Horse work.
		Grain.	Hay.	Straw or fodder.	Silage.	Pasture.			
		Lbs.	*Lbs.*	*Lbs.*	*Lbs.*	*Days.*		*Hrs.*	*Hrs.*
10	2.46	182	1,831	2,441	.....	166	$20.34	19	.....
2	2.00	2,750	3,000	.....	.....	202	.08	27	.....
17	1.87	1,731	4,353	1,067	667	217	16.09	17	.....
21	1.00	704	4,000	1,500	.....	198	.12	41	.....
8	1.00	1,328	6,000	2,000	4,000	213	.21	61	.....
19	.92	1,589	3,548	1,092	1,092	128	11.02	48	5
15	.92	1,782	4,367	4,913	1,638	203	21.92	51	.....
6	.50	448	3,000	.....	.....	6	25.22	25	.....
Average:									
10.67 L. U., 1926	1.33	1,269	3,508	1,594	723	181	16.57	31	1
19.95 L. U., 1925	1.53	1,021	3,277	1,127	1,666	131	4.61	38	9
Probable requirements for other horses	.....	1,250	3,000	1,000	.....	180	(a) .75	35	5

(a) Does not include service fees.

Horses Other Than Work Horses

Eight colts were foaled on the 15 farms in 1926. A few young horses and a few ponies, which mere not regularly worked, were also kept. Table IX shows the feed used on this class of stock. These horses were on pasture during the summer, but consumed almost as much roughage per live-stock unit as the work stock. The average quantity of grain fed was less than half the quantity fed the work horses.

The probable feed requirements call for much less grain, less roughage, and more pasture than for work horses. However, this is more grain and less roughage than was fed to young horses on the average.

CROPPING SYSTEMS

On the farms from which records were obtained, 40 per cent of the crop land in 1926 was in corn or grain sorghums; about 17 per cent was in oats; and 36 per cent was in alfalfa, clover and timothy, timothy, and prairie hay. Small acreages of sorgo for hay, Sudan grass for hay, and soybeans for hay and grain were also grown. The clover and timothy hay were in permanent meadows on most farms and were alternated with cultivated crops only when a new seeding was necessary. Few farmers in this section followed a definite cropping system.

A cropping system including some legume would provide a good ration for dairy cows and help to maintain soil fertility. A cropping system recommended by the Kansas Agricultural Experiment Station for dairy farms in this section would provide crops in the following ratio: corn or sorghum, 4, small grain, 2, sweet clover pasture, 1, and alfalfa, 2. Alfalfa and sweet clover should be rotated with other crops where possible. Alfalfa could be used in regular rotation by seeding one-half of the acreage every second year. In years when no alfalfa was seeded, sweet clover could be seeded with the small grain crop. The acreage of sweet clover to be used for soil improvement only would be plowed up and planted to a cultivated crop the following year. The growth of alfalfa and sweet clover on many farms is limited by the degree of acidity of the soil, and before a rotation including such a crop can be developed it will be necessary to lime much of the soil. In starting such a system legumes would necessarily first be seeded in such fields as are suited to legumes and then rotated on other fields as more land is put in condition. Soybeans for grain or hay might well be

included on many farms. Farms on which hogs were raised would require more grain and a larger acreage of corn than the foregoing rotation would provide. The grain production could be obtained by growing corn or grain sorghum for three years in the rotation rather than for two.

LABOR AND MATERIALS USED IN CROP PRODUCTION

While only a small proportion of the farm income was from crops, they furnished a large part of the feed used by live stock, and were an important part of the farm business.

The average quantities of seed, twine, man labor, and horse work used in production of crops and the average yield per acre for the principal crops on the dairy farms are given in the tables that follow. Probable requirements of labor and materials for the efficient production of crops under conditions most likely to prevail in the area are also shown. The suggested standards of accomplishment were determined by a study of the farm records for 1925 and 1926. In estimating the yields that can normally be expected, reports of the Kansas State Board of Agriculture of crop yields in the county for a series of years and the crop experiments of the Kansas Agricultural Experiment Station were considered.

LABOR REQUIREMENTS BY OPERATIONS

To estimate the quantity of labor which would be used in growing a given crop, the time ordinarily used for each operation was first determined and multiplied by the number of operations. Reports on farms where good practices were followed indicated the kind and the number of tillage operations necessary in this section. The time used for each tillage operation is influenced by a number of factors, such as the nature of the soil, the size and shape of fields, the size and type of equipment, and the size of the teams. Time required for harvesting is affected also by the yield of crops. Size of crew greatly affects the man hours used per acre in haying, threshing, filling silos, and other operations requiring more than one man. The managerial ability of the operator is of great importance and is responsible for a considerable portion of the total variations shown by labor records.

The standard requirements of man and horse hours per acre as shown in Table X are slightly lower than the average quantity used on the dairy farms, but are higher than the hours required by crops on farms where work was most efficiently done. These standards may be attained on most farms without undue effort and may be

TABLE X.—STANDARD LABOR REQUIREMENTS PER ACRE FOR THE VARIOUS OPERATIONS OF CROP PRODUCTION

OPERATION.	Size of machine.	Man hours.	Horse hours.	Acres per 10-hour day.
Seed-bed preparation:				
Cutting or breaking stalks	1-row stalk cutter	1.25	2.50	8.0
	2-section harrow	.60	1.20	16.6
Plowing	2-bottom, 14-inch gang	1.25	Tr.	8.0
	2-bottom, 12-inch gang	2.50	10.00	4.0
	1-bottom, 16-inch sulky	3.50	10.50	2.8
	1-bottom, 14-inch walking	5.00	10.00	2.0
Disking	7-foot	.75	3.00	13.3
Harrowing	2-section	.60	1.20	16.6
	2-section	.50	1.50	20.0
	3-section	.40	1.60	25.0
Planting row crops	2-row	.80	1.60	12.5
Cultivating row crops	2-section harrow	.50	1.00	20.0
	3-section harrow	.33	1.33	30.0
	1-row cultivator	1.50	3.00	6.7
	2-row cultivator	.83	3.33	12.0
Sowing small grain	7-foot drill	1.00	3.00	10.0
	7-foot drill	.80	3.20	12.5
	Broadcast	.50	.....	20.0
Harvesting corn and kafir:				
Binding	1-row	1.70	5.10	6.0
Shocking		2.00	.....	5.0
Cutting by hand		7.00	.....	1.4
Filling silo		12.00	12.00	10.0
Husking corn:				
From shocks		4.00	6.00	2.5
From standing stalks		5.00	10.00	2.0
Topping kafir		5.00	5.00	2.0
Threshing kafir		.75	.75	.....
Harvesting small grain:				
Binding	7-foot binder	1.00	3.00	10.0
	7-foot binder	.80	3.20	12.5
Shocking		.80	.....	12.5
Stacking		2.00	2.00	5.0
Stack threshing		.75	.50	13.3
Shock threshing		1.75	2.00	.....
Harvesting clover and timothy:				
Cutting	5-foot mower	1.00	2.00	10.0
Raking	10-foot rake	.67	1.34	15.0
Stacking *or*		3.00	2.00	.....
Baling		4.00	4.00	.....
Harvesting prairie hay:				
Cutting	5-foot mower	1.25	2.50	8.0
Raking	10-foot rake	.67	1.34	15.0
Stacking *or*		3.00	2.00	.....
Putting in barn *or*		5.00	5.00	.....
Baling		4.00	4.00	.....
Harvesting alfalfa:				
First cutting—				
Cutting	5-foot mower	1.00	2.00	10.0
Raking	10-foot rake	.67	1.34	15.0
Putting in barn		3.00	4.00	.....
Second cutting—				
Cutting	5-foot mower	1.00	2.00	10.0
Raking	10-foot rake	.50	1.00	20.0
Putting in barn		2.75	3.50	.....
Third cutting—				
Cutting	5-foot mower	1.00	2.00	10.0
Raking	10-foot rake	.50	1.00	20.0
Putting in barn		2.25	3.00	.....

surpassed where conditions are favorable or where especially good management is exercised.

The time required for operations with implements of different sizes is given since it is not always practical to use the same size of implement on all farms. Implements best suited to a large farm may be impractical for the small farm either on account of the cost of the implement itself or through the lack of teams or power necessary for its operation. The difference to be expected with the use of different sized teams is also shown. Combinations other than those shown often occur but only the most usual ones are listed.

Under the discussion of the several crops the usual operations are pointed out and by use of the standard requirements for each operation give a basis for estimating the total man and horse hours necessary for each crop.

CORN

Corn is the most important feed crop in this section. It is grown primarily for grain and is usually fed on the farm. Some corn is used for silage and a still smaller acreage is cut and fed as fodder, but on three-fourths of the acreage on the farms studied in 1926 the corn was husked from standing stalks.

The amounts of seed and labor used per acre and the yield obtained on each farm in 1926 are shown in table XI. The yield of grain ranged from 15 to 34 bushels per acre with an average of 25 bushels. The average yield in 1925 was 23 bushels per acre.

The average hours of man labor and horse work used in growing the crop and in harvesting when husked from the standing stalks or cut for silage and the variation on different farms are shown. The man labor used ranged from eight to 22 hours with an average of 16 hours per acre. To grow an acre of corn required, on the average, 39 hours of horse work. A part of the variation in time used per acre between farms is due to the nature and condition of the fields, a part to the size of implements used, and a part to variation in number of operations. Farms using large teams usually report less man labor per acre than farms on which small units are used, although differences in the ability of operators may also affect the number of hours worked.

The probable requirements of man labor, horse work, and materials for corn production, for the usual cultural practices are given, The usual operations of growing the crop consist of plowing the land once, disking once, harrowing twice, planting with a two-row planter, and cultivating four times with a one-row cultivator.

TABLE XI.—LABOR AND MATERIALS USED PER ACRE IN PRODUCING CORN, 1926

	Farm No.	Number of acres.	Seed.	Twine.	Man labor.			Horse work.			Total tractor work.	Yield per acre.
					Prior to harvest.	Harvest.	Total.	Prior to harvest.	Harvest.	Total.		
			Lbs.	*Lbs.*	*Hrs.*	*Hrs.*	*Hrs.*	*Hrs.*	*Hrs.*	*Hrs.*	*Hrs.*	*Bus.*
Corn husked from standing stalks	13	6	7	.....	6	2	8	10	5	15	1.4	25
	15	17	6	.....	8	10	18	27	15	42	.....	29
	17	28	7	.....	8	8	16	22	16	38	.....	34
	1	129	7	.....	10	6	16	25	10	35	.....	25
	21	32	6	.....	10	4	14	25	8	33	.....	20
	3	17	6	.....	10	9	19	24	18	42	.....	36
	11	19	7	.....	10	8	18	28	17	45	.....	24
	6	23	8	.....	11	9	20	32	12	44	.....	20
	19	29	7	.....	12	6	18	33	13	46	.....	24
	10	24	7	.....	13	4	17	29	9	38	.....	24
	9	16	5	.....	14	8	22	35	16	51	.....	25
	12	6	6	.....	14	8	22	28	15	43	.....	30
	2	18	9	.....	15	5	20	36	7	43	.....	15
Weighted av.:												
1926	.....	28	7	.....	10	6	16	27	12	39	.02	25
1925	.....	19	7	.....	13	7	20	31	11	42	.36	23
Probable requirements	.....	.....	7	.....	10	5	15	28	10	38	.....	25
												Tons.
Corn cut for silage	21	3	6	2.0	10	5	15	25	8	33	1.4	4
	13	25	7	1.2	6	6	12	10	10	20	.....	2
	3	20	6	2.5	10	16	26	24	13	37	.....	6
	12	11	6	1.3	14	17	31	28	17	45	.....	4
	18	3	10	2.0	13	31	44	34	30	64	.....	7
Weighted av.:												
1926	.....	12	7	1.7	9	13	22	22	13	35	(*a*) .28	4
1925	.....	18	7	2.2	13	15	28	30	18	48	(*a*) .40	4
Probable requirements	.....	.....	7	2.0	10	14	24	28	17	45	.....	5

(*a*) Does not include belt work.

Work done on some but not on all farms consists of breaking stalks, disking before plowing, listing, rolling, or harrowing after planting. On some farms the corn was cultivated with a two-row cultivator. Corn was replanted on two farms in 1926.

Also the necessary labor for husking corn from standing stalks and for cutting and ensiling corn is given. The yield per acre and the ability of the worker are two important factors that affect the labor used in harvesting corn. More labor per acre is used in putting corn in the silo than for husking from the field, or for cutting, shocking, and husking corn from the shock. Figure 12 shows the distribution of labor on a crop of 29 acres of corn in 1926.

GRAIN SORGHUMS

Grain sorghums are grown primarily as feed for live stock. The grain may be used for poultry or ground to take the place of corn in the ration for other stock, but more often the sorghums are grown for roughage. In 1926 approximately 45 per cent of the grain sorghum acreage on these farms was cut and put in the silo, and 25 per cent was bound and topped. A smaller portion was cut and fed without topping, while a small share of the crop was topped and threshed.

Kafir and feterita were commonly grown. The acre yield and method of handling the two crops were essentially the same. Grain sorghums were handled much the same as corn, except that they were likely to be planted on the poorer soil of the farm. The seasonal demand for labor on sorghums is somewhat later than for corn, and these crops ordinarily receive only two or three cultivations, as compared with four for corn.

Table XIII shows the labor used on grain sorghums cut for silage in 1926 and the probable labor per acre. The labor requirements for growing the crop are based on the following field operations: plowing once with a 12-inch gang plow and four horses, disking once, harrowing once, planting with a two-row planter, and cultivating three times with a one-row cultivator. The requirements for harvest are for cutting with a one-row corn binder and putting the crop in the silo.

The labor used when grain sorghum is cut, shocked, topped, and threshed is slightly less than the total labor used for putting the crop in the silo.

Figure 12 shows the seasonal distribution of man labor on kafir in 1926 for one farm on which the entire crop was put in the silo.

TABLE XII.—LABOR AND MATERIAL USED PER ACRE IN PRODUCING KAFIR CUT FOR SILAGE, 1926

FARM NO.	Number of acres.	Seed.	Twine.	Man labor.			Horse work.			Total tractor work.	Yield per acre.
				Prior to harvest.	Harvest.	Total.	Prior to harvest.	Harvest.	Total.		
		Lbs.	*Lbs.*	*Hrs.*	*Hrs.*	*Hrs.*	*Hrs.*	*Hrs.*	*Hrs.*	*Hrs.*	*Tons.*
19	7	9	2.0	8	10	18	21	12	33	.....	4.1
21	5	8	2.4	8	10	18	22	13	35	.....	5.0
6	17	12	.....	12	12	24	28	20	48	.....	4.8
18	4	11	2.4	17	14	31	46	14	60	.....	6.7
2	20	10	2.7	13	19	32	38	22	60	.....	6.6
17	6	9	3.1	10	21	31	25	25	50	.....	5.2
8	7	9	4.0	9	21	30	23	25	48	.....	5.9
1	19	8	3.1	7	23	30	18	45	63	.....	10.4
Weighted av.:											
1926	11	10	2.2	10	17	27	27	26	53	.....	6.7
1925	12	7	2.3	9	11	20	21	17	38	.6	3.8
Probable requirements	.....	6	3.0	9	14	23	25	17	42	.....	6.5

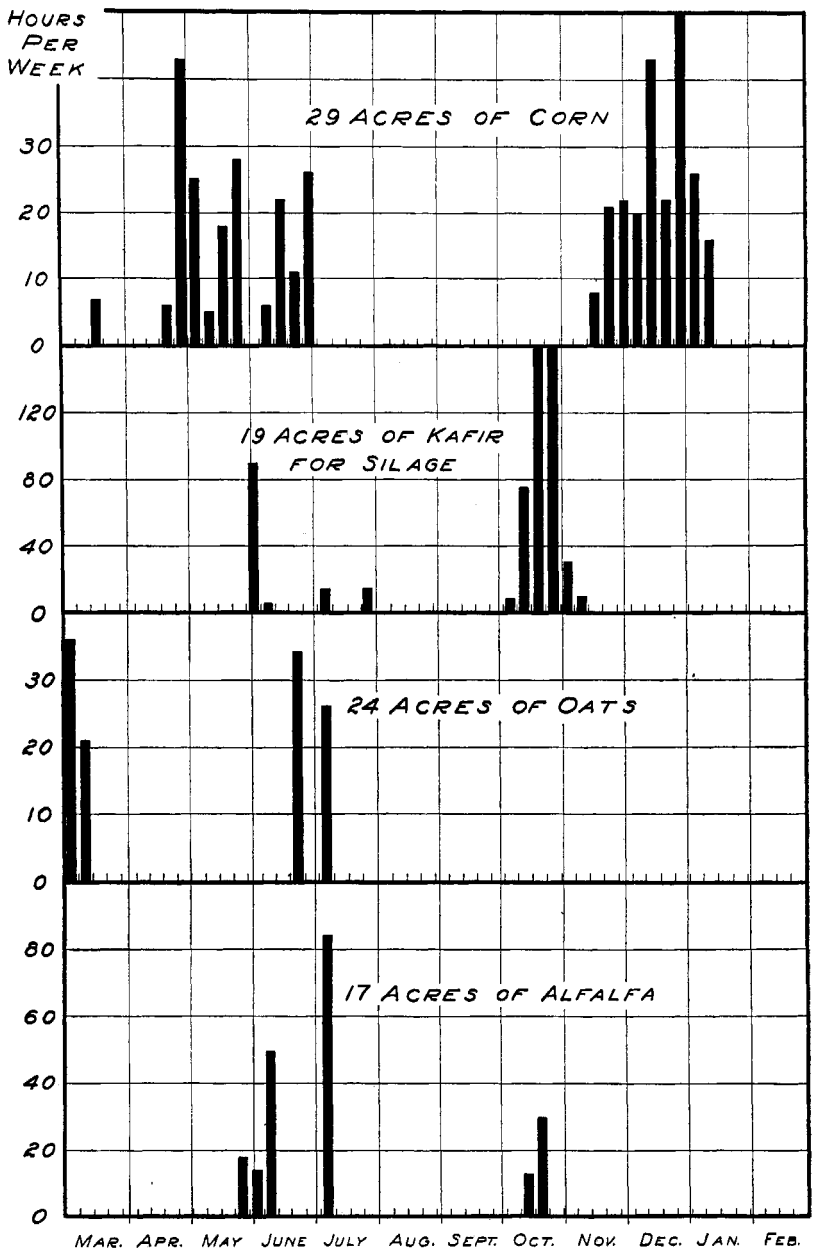

FIG. 12.—Distribution of man labor by weeks on specified acreages of the more important crops.

TABLE XIII.—LABOR AND MATERIALS USED PER ACRE IN PRODUCING OATS, 1926

FARM NO.	Number of acres.	Seed.	Twine.	Man labor.			Horse work.			Total tractor work.	Yield per acre.
				Prior to harvest.	Harvest.	Total.	Prior to harvest.	Harvest.	Total.		
		Lbs.	*Lbs.*	*Hrs.*	*Hrs.*	*Hrs.*	*Hrs.*	*Hrs.*	*Hrs.*	*Hrs.*	*Bus.*
1	73	62	1.7	2	5	7	6	3	9	1.3	18
21	16	68	1.8	2	4	6	7	6	13	.....	22
11	24	80	.8	2	3	5	9	5	14	.....	18
15	36	58	2.1	3	4	7	8	5	13	.....	25
17	30	51	2.0	3	5	8	10	7	17	.....	27
13	10	62	1.6	3	3	6	7	6	13	1.2	23
19	17	61	1.8	4	3	7	15	5	20	.....	17
6	20	74	.8	5	6	11	17	9	26	.....	20
8	24	72	2.0	7	7	14	13	8	21	.....	22
Weighted av.:											
1926	26	65	1.7	3	5	8	9	5	14	.4	21
1925	18	65	1.8	4	3	7	13	5	18	.....	17
Probable requirements for production	.....	64	2.0	3	3	6	11	5	16	.....	25

OATS

Oats was the only small grain crop of importance reported on the farms from which records were obtained. Of the 15 farms, 12 reported oats in 1926. Practically all of the oats grown was fed on the farm. The small grain crop usually followed corn in the cropping system, and when this was done the common field operations consisted of disking the land twice, harrowing once, seeding, binding, shocking, and threshing. A few fields of oats were stacked and threshed from the stack. In a few cases the land was plowed before seeding. Timothy and clover or sweet clover was sometimes seeded with oats.

Table XIII shows the man labor, horse work, seed, and twine used per acre in growing oats in 1926. The yield of grain ranged from 18 to 27 bushels per acre, with an average of 21 bushels. The average acre yield on these same farms in 1925 was only 17 bushels.

The probable labor requirements for growing and harvesting oats, are based on the time required when the usual practices were followed. With the applications of fertilizers higher yields should be obtained, and the labor of harvesting and threshing would be slightly increased. More labor was used in stacking and threshing from the stack than when the grain was threshed from the shock.

Figure 12 shows the seasonal distribution of labor on a 24-acre field of oats in 1926.

ALFALFA

Alfalfa is the most valuable hay crop on the dairy farms. Some alfalfa was reported on practically all farms from which records were obtained, but the acreage could well be increased on many farms, and for the county as a whole the acreage should be greatly increased. Sweet clover and soybean hay have been substituted for alfalfa hay to a certain extent.

Because of the acidity of the soil and the general lack of phosphorus, land being prepared for alfalfa should be limed and fertilized. Ground limestone at the rate of two tons and super-phosphate at the rate of 150 pounds per acre should enable a successful seeding to be obtained under usual conditions if proper attention is given to the preparation of the seed bed. On good land superphosphate alone may be used, but on thin land, where manure cannot be applied, a fertilizer containing nitrogen (as well as phosphorus), such as 4-12-0 or 4-16-0, is recommended. Old stands of alfalfa will be benefited by an application of 300 pounds of acid phosphate fertilizer about every second year. Application of lime

TABLE XIV.—MAN LABOR AND HORSE WORK USED PER ACRE FOR HARVESTING ALFALFA, 1926

FARM NO.	First cutting.				Second cutting.				Third cutting.			
	Acres.	Yield.	Man labor.	Horse work.	Acres.	Yield.	Man labor.	Horse work.	Acres.	Yield.	Man labor.	Horse work.
		Tons.	*Hrs.*	*Hrs.*		*Tons.*	*Hrs.*	*Hrs.*		*Tons.*	*Hrs.*	*Hrs.*
19	4	0.5	2	5	.....	.....	.....	.....	.....	.....	.....	.....
6	13	.3	4	6	13	0.2	5	8	8	0.3	4	6
13	5	.4	4	8	5	.2	3	5	5	.2	3	5
8	17	.2	5	7	17	.4	5	7	17	.2	3	4
9	5	1.0	6	9	5	.6	7	9	.....	.....	.....	.....
1	26	.9	6	12	26	.8	3	6	14	1.0	4	7
21	10	.7	6	11	3	.6	4	7	3	.3	4	5
18	5	1.9	6	8	5	1.3	6	5	5	1.5	6	12
17	3	.7	8	13	3	.7	3	5	.....	.....	.....	.....
2	10	1.2	8	14	10	.9	5	9	.....	.....	.....	.....
Weighted av.:												
1926	10	.7	6	10	10	.6	4	7	9	.6	4	6
1925	10	.8	5	7	12	.7	5	9	11	.4	4	8
Probable requirements for production	.....	1.0	5	7	.....	.8	4	7	.....	.7	4	6

after seeding is not necessary. Alfalfa is sometimes seeded in the spring with oats or in the fall following oats.

Table XIV shows the yield per acre and the labor reported for each cutting of alfalfa in 1926. The second and third cuttings were usually lighter than the first, and on a small acreage only one crop was obtained. The time required for mowing and raking an acre was practically the same for each cutting, but the heavier cuttings required more labor for stacking or putting in the hay mow. The suggested labor requirements should be sufficient for a yield of 2.5 tons per acre. Alfalfa yields on some of these farms were low because of poor stands.

Figure 12 shows the distribution of labor by weeks in 1926 on 16.75 acres of alfalfa from which three cuttings were obtained.

CLOVER AND TIMOTHY

Seedings of clover and timothy are more easily obtained than seedings of alfalfa, and from the standpoint of acreage this mixture is the most important hay crop. As a rule the fields once seeded were left in grass for a number of years and as a result the proportion of clover to timothy in the hay was low. About 57 per cent of the timothy and clover was baled directly from the windrow, 22 per cent was stacked, and 20 per cent put in the barn.

PRAIRIE HAY

Prarie grass was cut for hay on most of the farms. Often this native hay was on land too rough to be broken out and cultivated. Of the total acreage of prairie hay 50 per cent was baled, 17 per cent was stacked, and 37 per cent was put in the barn. The labor required for prairie hay was about the same as for timothy. Some prairie hay was sold, but most of it was fed to horses or young cattle.

OTHER CROPS

Crops less commonly grown but which had a significant place in the farm business were cane, soybeans, and sweet clover. For sorgo (cane) planted in rows and cultivated the labor requirements were practically the same as for grain sorghum but a higher yield of fodder or silage was obtained.

Soybeans were grown to a limited extent on the farms but the data were insufficient to provide a basis for estimating long-time average yields or probable labor requirements. Soybeans when threshed were used as a substitute for cottonseed meal in the dairy ration or when cut for hay were substituted for alfalfa. As a rule,

however, the soybeans grown on these farms were planted in the rows with corn and put in the silo.

Sweet clover was used primarily for pasture for the milking herd. Seeded with oats at the rate of about eight pounds per acre, sweet clover makes a valuable addition to the crops in the rotation and furnishes pasture in the hot summer season when the native pastures are usually short. Sweet clover, though a biennial, will often reseed itself if the field is not pastured too heavily.

PRICES OF FARM PRODUCTS

The prices used in estimating returns and in outlining the suggested farming systems are taken primarily to represent the price relations that appear probable over a long period. It is recognized that in any one year the prices of particular crops or live-stock products may be higher or lower than those used, but as quantities are given, differences due to price changes can be easily computed. Prices shown in Table XV are based on a study of state and county average prices in recent years, on quotations of prices in Fort Scott since 1921, and on prices received for products on these farms during the period the study was made. In arriving at the prices used, long-time trends and prices likely to prevail at the season of the year when the product is to be marketed have been considered.

TABLE XV.—PRICES OF FARM PRODUCTS AND COST OF MATERIALS USED IN ESTIMATING RETURNS FROM DIFFERENT SYSTEMS OF FARMING

ITEM.	Price.	ITEM.	Price.
Milk, 4% B. F. (cwt.)	$2.15	Meat scrap (cwt.)	$4.25
Butter fat (lb.)	.35	Alfalfa hay (ton)	15.00
Cows (head)	50.00	Timothy hay (ton)	11.00
Heifers (head)	40.00	Prairie hay (ton)	8.00
Veals (cwt.)	8.00	Alfalfa seed (bu.)	12.00
Eggs (dozen)	.22	Flax seed (bu.)	2.00
Poultry (lbs.)	.18	Timothy seed (bu.)	4.00
Hogs (lbs.)	.085	Clover seed (bu.)	16.00
Corn (bu.)	.70	Sweet c'over seed (bu.)	8.00
Kafir (bu.)	.70	Seed oats (bu.)	.60
Oats (bu.)	.45	Twine (lb.)	.15
Bran (cwt.)	1.40	Limestone crushed (ton)	1.25
Shorts (cwt.)	1.70	Acid phosphate (ton)	15.00
Cottonseed meal (cwt.)	2.25	Mixed fertilizer, 2-14-0, (ton)	40.00
Tankage (cwt.)	3.75		

The prices used were taken from a study of (*a*) reports of Kansas State Board of Agriculture, (*b*) United States Department of Agriculture, Statistical Bulletin No. 15, "Prices of Farm Products Received by Producers, North Central States," (*c*) Prices paid to farmers in 1925 and 1926, and (*d*) Market reports from the Fort Scott *Tribune-Monitor*.

SUGGESTED SYSTEMS FOR DAIRY FARMS

The probable requirements of materials and labor for crop production and the quantities of feed and labor most likely to be used in live-stock production have been shown. These production re-

lations, with a study of the organization of the most successful farms of the area, make it possible to outline systems of farming which should prove more profitable than some now in use. These suggested systems of farming, or plans for farm operation, are similar to systems now followed on some of the farms from which records were obtained although changes from the actual organizations have been made where conclusions from this and other studies would indicate that increased farm returns could be affected through shifts in organization. The suggested combinations of crops and livestock enterprises are those which appear to be most profitable under conditions as they exist at present and for the years immediately ahead.

Requirements of labor and materials for crop production, and of feed and labor for live stock are taken from the standard requirments and probable quantities given in the first section of this bulletin. Yields and prices assumed are those which can reasonably be expected by most of the farmers in this section. The suggested farming plans attempt to obtain as nearly as is practical a uniform distribution of labor and to produce crops which can be best used by live stock and yet maintain the fertility of the soil. Minor enterprises which can be profitably carried on are also suggested.

Suggested System for a 160-acre Farm

The farm organization suggested for a 160-acre dairy farm in this section differs from the organization of the typical farm in having a smaller acreage of grain crops, a larger acreage of legumes for hay and pasture, and in carrying a larger number of cows and poultry. The labor program, under the suggested system calls for a greater total number of hours of work for the year than is required on the usual farm, but the demand for the workman's time is more regularly distributed throughout the year. The system of dairy farming suggested would require less labor for crops during certain periods than is needed for the systems usually followed. With some extra labor during the crop season and at haying time the 160-acre dairy farm suggested could be handled by the operator and his family. (Fig. 13.)

With crop yields equal to those normally obtained these farms would produce sufficient grain and hay for a dairy herd of 15 milk cows, but would not produce a surplus for sale and some supplementary feed would have to be purchased. Table XVI shows the acreage of crops for the system suggested and the quantity of feed

which would be produced in years of average crop yields. The acreage in different crops assumes that there will be 100 tillable acres on the 160-acre farm and that wherever practical alfalfa will be rotated over all fields. On many farms a larger or smaller proportion of the land area is in native pasture, but the acreage given seems to represent the proportion of pasture to crop land most commonly found on farms of this size.

TABLE XVI.—ESTIMATED CROP PRODUCTION AND USE OF CROPS ON SUGGESTED ORGANIZATION FOR A 160-ACRE FARM

Crop.	Acres.	Acre yield.	Total production.	Use of crop.		
				Quantity fed.	Quantity seeded.	Available for sale.
Corn	25	25 bus.	625 bus.	618 bus.	4 bus.	3 bus.
Kafir grain	4	30 bus.	120 bus.	118 bus.	2 bus.	.....
Kafir or sweet sorghum silage	11	6.5 T.	71½ T.	70 T.	.....	.....
Oats	20	25 bus.	500 bus.	460 bus.	40 bus.	.....
Oat straw	.....	.4 T.	8 T.	2.5 T.	.....	.....
Alfalfa	20	2.5 T.	50 T.	37.5 T.	.....	12.5 T.
Prairie hay	10	1.0 T.	10 T.	10.0 T.	.....	.....
Sweet clover	10	.....	Pasture	.....	.....	.....

Where the crop land can be divided into fields of approximately the same size and a regular cropping system followed, each field would be in a cultivated crop for two years, and oats for one year. One-half of the oat field would be seeded to sweet clover with the oats as a nurse crop and would be in sweet clover for one year. Alfalfa could be included in the rotation by preparing for fall seeding one-half of the oats field each alternate year. This would leave the field in alfalfa for four years. One-half of the alfalfa acreage would be plowed every second year and a grain crop planted. In alternate years, when no alfalfa is to be seeded, it would be advisable to seed the entire small-grain acreage to sweet clover. This would aid in maintaining soil fertility and the clover not needed for pasture could be followed with a grain crop the following year. This cropping system would maintain the proportion of crop acreages on which the production given in Table XVI is based.

Higher yields of silage are obtained from grain sorghums than from corn. Since experiments have shown kafir silage to be only slightly inferior to corn silage as a feed for dairy cows probably the best policy is to fill the silo with sorghum and to save the corn for grain. Oats when used as a nurse crop for grass is seeded at about one-half the usual rate and the estimated yield is correspondingly light.

One practical disadvantage in using sweet clover pasture in a rotation is that in some years the rotation pasture would be apart from the barn or permanent pasture and difficulty in caring for cows would arise. In many cases, however, the sweet clover for pasture could be seeded in accessible fields and alfalfa for hay or clover for green manure seeded in the others.

The probable distribution of feed to live stock is shown in Table XVII. The quantity of feed for each class of live stock is estimated from the probable requirements of live stock given in Tables IV to VIII and on the number of each class of live stock assumed in the organization. Feed for dairy cows is based on a production of 250 pounds of butter fat per cow and a pasture season of 160 days. Four horses should supply ample power for field work. No feed allowance is made for young horses or colts as a charge for replacing horses is included in farm expenses.

TABLE XVII.—ESTIMATED QUANTITIES OF FEED USED BY LIVE STOCK ON SUGGESTED ORGANIZATION FOR 160-ACRE FARM

FEED.	Milk cows, 15.	Other cattle, 10.5 live-stock units (a).	Poultry, 200 hens.	Hogs, 2,750 lbs. pork.	Horses, 4.	Total feed used.
Corn and cobmeal (pounds)	12,750	5,250				18,000
Corn (pounds)			5,200	11,000	4,000	20,200
Silage (tons)	49	21				70
Kafir (pounds)			6,600			6,600
Oats (pounds)	4,500		2,200		8,000	14,700
Oat straw (tons)		2.5				2.5
Alfalfa (tons)	24.5	12.0			1	37.5
Prairie hay (tons)		1			9	10
Bran (pounds)	4,500		2,000			6,500
Middlings (pounds)				687		687
Cottonseed meal (pounds)	3,750	1,050				4,800
Tankage (pounds)			1,000	412		1,412
Whole milk (pounds)		4,725				4,725
Skim milk (pounds)		6,562	2,000			8,562

(a) 1 bull; 5 heifers; 6 yearlings; 6 calves.

Under feed for cattle other than milk cows is included the requirements for one bull, five heifers, five yearlings, six heifer calves kept for replacements in the herd, and six calves to be vealed at the age of six weeks.

The feed allowance for pork production assumes that pasture for hogs is available. Where no more than 2,700 pounds of pork are produced the number of pigs needed could be farrowed by one sow having two litters each year or from two sows with one litter each.

With the acres of crops outlined and normal crop production, the number of live stock suggested would consume all the feed produced, except a small proportion of alfalfa. In favorable crop years a surplus of crops would allow either for some crops to be held over as a reserve against a possible short crop the following year, or for crop sales, or for the expansion of the pork and poultry enterprises to make use of more grain. Years of unfavorable crop yields would require some purchased feed, or a corresponding reduction in the production of live stock and live-stock products.

The estimated production of live-stock products and the value of sales are shown in Table XVIII. Under this farming system nearly 60 per cent of the income would come from the sale of whole milk. It is a common practice on farms from which whole milk is sold to separate a part of the milk so that skim milk for feeding calves and chickens can be obtained. Hence some cream is sold. Some income would also be obtained from the sale of young cattle and with the production of a surplus of rough feed on the farm young stock should have a significant place in the farm business. If a ready market for good dairy animals is available it should be profitable to keep the most promising heifer calves. Poultry and pork are also important sources of income.

TABLE XVIII.—ESTIMATED LIVE-STOCK PRODUCTION AND USE OF PRODUCTS ON SUGGESTED ORGANIZATION FOR 160-ACRE FARM

Live Stock.	No.	Total production.	Use of product.				
			Used on farm.	Used in home.	Sold.		
					Quantity.	Price.	Value.
Cows...	15	3,750 lbs. B. F.,	190 lbs.	170 lbs.	78,421 lbs. 3.8% milk,	$2.04¼ per cwt.	$1,601.75
					410 lbs. B. F.....	38c per lb.....	155.80
					4, 1,100-lb. cows.....	5c per lb.....	220.00
					2 heifers.....	$40 each.....	80.00
					6 veal calves.....	$16 each.....	96.00
Hens...	200	1,700 doz. eggs..	100 doz.	200 doz.	1,400 doz.....	20c per doz.....	280.00
		1,000 lbs. meat..	.....	120 lbs.	880 lbs	18c per lb.....	158.40
Sows...	2	2,750 lbs. meat..	.....	400 lbs.	2,350 lbs.....	8½c per lb.....	199.75

The principal items of expense likely to be incurred as shown in Table XIX are for purchased feed; live-stock expense consisting primarily of cow-testing association fees, veterinarian and medicine, milk hauling, and replacement of work stock and bulls; and crop expenses such as the cost of twine, grass seed, lime, phosphate, and threshing. Expenses, which depend on size of farm as well as on organization, are charges for repair and replacement of machinery, buildings, and fences; taxes; and to some extent, hired labor and miscellaneous expense.

Table XIX shows a comparison of the organization and expected return under the suggested system with returns from an organization

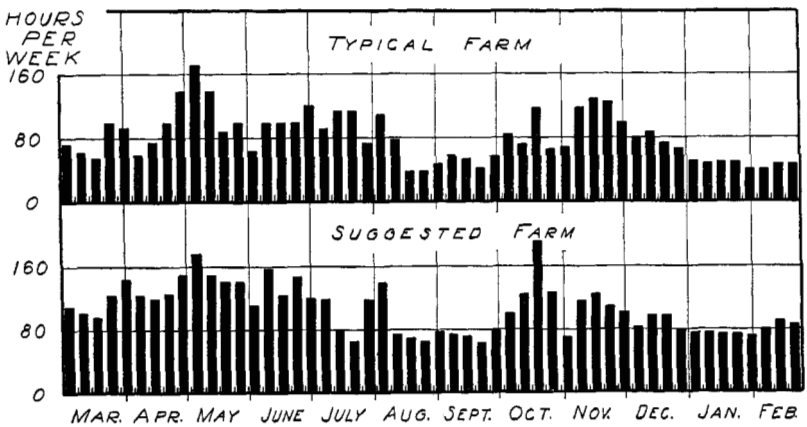

FIG. 13.—Distribution of man labor by weeks on 160-acre typical and suggested farms. The suggested system requires more labor than the typical system. However, much of this additional labor comes at a time when it can be done by regular workers.

typical of farms in the county. In order to show the effect of the combination of enterprises on farm expenses, labor, and monetary returns, the requirements of production for both crops and live stock are assumed the same for both types of farms.

The system suggested would carry more cows and poultry than the typical farm but since the cows would require most of the farm-grown grain less pork would be produced.

A surplus of both grain and hay would be produced on the typical farm during the years of normal yields and a part of the farm income is obtained from this source, whereas little surplus of crops could be expected from the suggested system of dairy farming.

Expenses under the suggested system would be heavier, more

TABLE XIX.—COMPARISON OF THE ORGANIZATION AND RETURNS ON 160-ACRE FARMS UNDER THE SUGGESTED AND THE TYPICAL SYSTEMS

	Suggested System.		Typical System.	
	Acres.	Production.	Acres.	Production.
Organization.				
CROPS:				
Corn	25	625 bus.	40	1,000 bus.
Kafir or sweet sorghum silage	11	71.5 T.	5	32.5 T.
Kafir grain	4	120 bus.	5	150 bus.
Oats	20	500 bus.	20	500 bus.
Alfalfa	20	50 T.	.....	.....
Clover and timothy	.....	.....	15	18.75 T.
Prairie hay	10	10 T.	15	15 T.
Sweet clover	10	.....	.....	.....
Native pasture	50	.....	45	.....
Other hay	.....	.....	5	10 T.
Bldgs. and waste	10	.....	10	.....
LIVE STOCK:	*Number.*		*Number.*	
Cows	15	3,750 lbs. B. F. 13 calves	6	1,500 lbs. B. F. 5 calves
Poultry	200	1,700 doz. eggs 1,000 lbs.	75	625 doz. eggs 375 lbs.
Brood sows	2	2,750 lbs. pork	4	4,500 lbs. pork
Horses	4	.....	5	.....
Expected Sales.				
CROPS:	*Quantity.*	*Value.*	*Quantity.*	*Value.*
Corn	.....	.....	463 bus.	$324
Kafir	.....	.....	113 bus.	79
Alfalfa	12.5 T.	$188	.....	.....
Prairie hay	.....	.....	13 T.	104
LIVE STOCK AND PRODUCTS:				
Whole milk	78,421 lbs.	$1,602	26,800 lbs.	$548
Butter fat	410 lbs.	156	228 lbs.	87
Veals	6	96	2	32
Cows and heifers	6	300	3	150
Eggs	1,400 doz.	280	387 doz.	78
Poultry	880 lbs.	158	375 lbs.	68
Pork	2,350 lbs.	200	4,100 lbs	348
Totals	.....	$2,980	.....	$1,818
Expenses.				
Purchased feed	.....	$269	.....	$139
Live stock expense	.....	329	.....	188
Lime	.....	38	.....	.....
Crop expense	.....	119	.....	119
Machinery	.....	235	.....	247
Upkeep and miscellaneous	.....	258	.....	235
Taxes	.....	176	.....	156
Hired labor	.....	175	.....	50
Totals	.....	$1,599	.....	$1,134
Receipts minus expense	.....	$1,381	.....	$684
Products used in home	.....	260	.....	260
Farm earnings	.....	1,641	.....	944
Interest on $13,500 @ 5%	.....	675	Int. on $12,000	@ 5% 600
Family earnings	.....	966	.....	344

feed would be purchased, and the live stock and crop expenses would be somewhat higher. The more frequent seeding of legumes and the use of lime and fertilizer are the chief factors causing the greater crop expense. The cost of upkeep and replacement of machinery and buildings is estimated at the same rate for each system.

Using the same production and prices in computing returns, the suggested system shows an estimated excess of receipts over expenses

of $1,331 as compared to $684 for the typical system. A larger investment is necessary, however, for the dairy farm. After allowing an interest charge of 5 per cent on the investment, the estimated returns from the suggested system for the management of the farmer and the labor of himself and family is $966 as compared to $344 for the typical farm. This would leave the operator of a farm similar to that suggested with a return for his own efforts of $622 greater than from the typical organization.

Under actual farming conditions the advantage of the organization suggested would probably be much greater than this. Soil fertility could be maintained and crop yields should be higher and less variable on a farm using legumes and maintaining an adequate number of live stock. Likewise, the assumed standard of live-stock production could be attained with less effort under the conditions suggested. It is unlikely that a production of 250 pounds of butter fat per cow could be obtained without silage or legume hay unless large quantities of high-protein concentrates were purchased. It is questionable, also, if many farmers in this section would erect and fill a silo for a herd of six dairy cows.

ALTERNATE SYSTEMS OF FARMING

There is little question that dairying provides the most profitable system of farming in this section under present conditions. The market for whole milk enables the dairyman to obtain a higher price for his products than if it were sold as cream and the skim milk kept on the farm. The large proportion of rough or rocky land on nearly all farms means that some live stock must be kept to utilize this pasture. Only the larger farms can carry enough stock cattle to make a family-sized business, consequently the smaller farms are turned to milk production. Low yields of wheat and corn together with small acreage prevent farmers in this section from profitably producing grain for sale.

Some farmers turn to pork production, particularly those years when pork is high in price, and a combination of dairy, pork, and poultry may be successful on some farms. A typical farm organized for pork production, with enough cows to pasture on rough land and use the roughage, and growing grain primarily for feeding hogs, would have a larger acreage of grain and a smaller acreage of hay than the farm suggested for dairying. Assuming 50 acres in native pasture, 10 in prairie hay, 10 for buildings, farm lots, or waste, and 14 for permanent hog pasture and alfalfa hay,

the remaining 76 acres of crop land could be used to grow 57 acres of corn or kafir and 19 acres of oats. The crop land would be in a cultivated grain crop three years and in oats one year. It would be desirable to seed with the oats sweet clover for fall pasture or for green manure.

Returns have been estimated for a farm selling cream, pork, and poultry products. The probable requirements previously given for crop and live-stock production were used in estimating the feed required and the products obtained. With six cows, young cattle to maintain the herd, a flock of 200 hens, and hogs to produce 14,300 pounds of pork, receipts from the sale of live stock and live-stock products were estimated at $2,265. A small surplus of hay would bring the total receipts up to $2,342.

Supplementary feed for dairy and pork production and other expenses estimated on the basis used in computing cost items on the suggested and the typical 160-acre farms would total $1,212.

After crediting the farm with the value of home-used products and deducting 5 per cent for interest on investment, the return to the family would be $785 as compared to $966 on the suggested dairy farm and $344 on a typical farm.

This return is estimated from prices of $2.15 per hundredweight for milk, $0.38 per pound for butter fat, and $0.085 per pound for pork. With the assumed yields and production, hogs would have to sell for $10 per hundredweight before the farm return would equal that of the dairy farm. A drop in the price of milk would of course make the second system relatively more profitable than the comparison shown.

Shifts in farm organization are seldom made by changing from one system to an entirely different one. Instead, as pork prices increased or milk prices decreased, hogs would be substituted in the organization, the least profitable cows disposed of, and the changes made slowly. While some adjustments to meet prices can be made profitably, a large element of risk is involved in shifting completely from one system to another.

Suggested System for an 80-acre Farm

An 80-acre farm organized to provide work for one man and return an income sufficient for the needs of a family will be more intensively operated than the 160-acre farm. That is, more live stock, in proportion to the acreage, will have to be carried and a larger proportion of the farm must be in crop land. To maintain the live stock more feed crops would be grown and a larger

proportion of the concentrates purchased. It seems probable that most operators of 80-acre farms could expand their business more profitably by obtaining additional crop land rather than by cultivating the present acreage more intensively. However, a large per cent of the farmers in this section have only 80 acres and in some instances additional land may not be available.

TABLE XX.—COMPARISON OF ORGANIZATION AND RETURNS ON 80-ACRE FARMS UNDER THE SUGGESTED AND THE TYPICAL SYSTEMS

	Suggested System.		Typical System.	
	Acres.	Production.	Acres.	Production.
Organization.				
CROPS:				
Corn	10	250 bus.	25	625 bus.
Kafir or sweet sorghum silage	6.5	42.5 T.	.....	.....
Kafir grain	3.5	105 bus.	5	150 bus.
Oats	10	250 bus.	10	250 bus.
Clover and timothy	.....	.....	10	12.5 T.
Alfalfa	10	25 T.	.....	.....
Prairie hay	5	5 T.	5	5 T.
Sweet clover	10	.....	.....	.....
Native pasture	20	.....	20	.....
Waste	5	.....	5	.....
LIVE STOCK:	*Number.*		*Number.*	
Cows	10	2,500 lbs. B. F.	4	1,000 lbs. B. F.
Poultry	200	1,700 doz. eggs 1,000 lbs.	75	625 doz. eggs 375 lbs.
Brood sows	.....	.....	1	1,500 lbs. pork
Horses	3	.....	3	.....
Expected Sales.				
CROPS:	*Quantity.*	*Value.*	*Quantity.*	*Value.*
Corn	.....	.....	300 bus.	$210
Kafir	.....	.....	113 bus.	79
Oats	.....	.....	60 bus.	27
Hay	4 T.	$50	.....	.....
LIVE STOCK AND PRODUCTS:				
Whole milk	1,950 lbs. B. F.	$1,048	.....	.....
Butter fat	213 lbs.	81	762 lbs.	290
Veals	7	112	2	32
Cows or heifers	2	100	2	100
Eggs	1,400 doz.	280	.....	85
Poultry	880 lbs.	158	.....	46
Pork	.....	.....	1,100 lbs.	94
Totals	.....	$1,829	.....	$963
Expenses.				
Purchased feed	.....	$237	.....	$84
Live stock expense	.....	241	.....	51
Lime	.....	18	.....	.....
Crop expense	.....	64	.....	58
Machinery charge	.....	129	.....	128
Farm upkeep	.....	138	.....	115
Miscellaneous	.....	120	.....	120
Taxes	.....	118	.....	101
Totals	.....	$1,065	.....	$657
Receipts minus expense	.....	$764	.....	$306
Products used in home	.....	260	.....	260
Farm earnings	.....	1,024	.....	566
Interest on $9,000 @ 5%	.....	450	Int. on $7,775 @ 5%	389
Net return to family	.....	574	.....	177

The system suggested for an 80-acre dairy farm is outlined in Table XX and the expected returns are compared with those from an organization that is typical of farms of this size. The cropping system would differ from that commonly followed in having a larger acreage of legumes for hay and having a smaller acreage of crops for grain. Sweet clover to supplement the native pasture is recommended and wherever practicable should be included in the crop rotation. Alfalfa should also be included in the rotation wherever possible. The 20 acres of prairie pastures and 10 acres of sweet clover should supply summer pasture for a herd of 10 cows and young cattle to replace the herd.

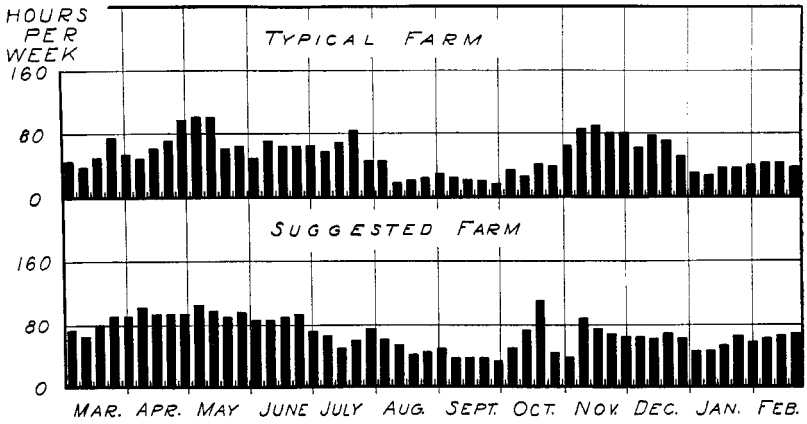

FIG. 14.—Distribution of labor by weeks on 80-acre typical and suggested farms.

Three horses would provide sufficient power to do the field work for the crops outlined. Because of the small supply of grain no hogs are included in the plan for the dairy farm but a flock of 200 chickens is suggested to give one minor enterprise and to utilize waste feed. With proper management a larger flock of poultry could well be carried.

Using the production and the quantities of labor and materials for production as given in the probable requirements, the estimated gross income for the suggested organization is nearly double that estimated for the typical farm. Expenses would be somewhat higher yet the excess of probable receipts over expected expenses is $764 for the suggested dairy farm as compared to $306 on the typical farm. The return to the operator and family after crediting the value of products used in the home and deducting the charge for

interest on investment is $574 as compared to $177 on the typical farm.

More labor is required for the suggested system and an operator would have little time for outside work, a factor which is important on many of the smaller farms. (Fig. 14.)

In the case of the small farm, returns as estimated from the probable requirements for production are low and where it is impractical to increase the size of the business, the income might be increased through a greater production of milk per cow or of crops per acre. Crop yields on a farm, heavily stocked as is suggested, would undoubtedly be larger than the average yields for the area. Cows with greater capacity and well cared for would give greater production per cow. Many operators could realize higher returns than those estimated for the purpose of comparing the profitableness of the two systems through better than average crop yields and by maintaining live stock of higher production per animal.

Suggested System for a 320-Acre Farm

As a rule, farms of 320 acres have a larger proportion of the farm in grass land and carry more stock cattle than do smaller farms. Since stock cattle require less labor than milk cows one man can handle a larger acreage than could be handled if the farm were devoted to dairy production. Reorganized on the plan of the 160-acre farm, the system for the 320-acre farm would differ in having enterprises practically double in size and would require approximately double the labor. Some difference in labor required might result from the opportunity for a more efficient use of labor on the larger farms.

As a rule the larger farms are rougher than the small farms and have a larger proportion of non-tillable land. The suggested organization for the 320-acre farm as outlined is for a farm with 140 acres of pasture and 15 acres in waste land, lots, and buildings.

The cropping system previously outlined, kafir or corn first year, corn second year, oats third year with alfalfa or sweet clover following, would give the crop acres shown in Table XXI. One-half of the alfalfa would be seeded every second year and remain on the land for four years. According to this system the acreage of corn would be less than on the typical farm; however, the total acreage of cultivated row crops is practically the same. The suggested cropping system also has more alfalfa, less prairie hay, less timothy and clover, and includes some sweet clover for pasture and soil de-

velopment. In estimating the crop production given in the comparative table, yields per acre were assumed to be the same for each type of farm.

TABLE XXI.—COMPARISON OF ORGANIZATION AND RETURNS ON 320-ACRE FARMS UNDER THE SUGGESTED AND THE TYPICAL SYSTEMS

	Suggested System.		Typical System.	
	Acres.	Production.	Acres.	Production.
Organization.				
CROPS:				
Corn	40	1,000 bus.	50.0	1,250 bus.
Kafir or sweet sorghum silage	18	117 T.	10.5	68.2 T.
Kafir grain	6	180 bus.	4.5	135 bus.
Oats	32	800 bus.	25.0	625 bus.
Clover and timothy			25.0	31.2 T.
Alfalfa	32	80 T.	5.0	12.5 T.
Prairie hay	21	21 T.	40.0	40.0 T.
Other hay			5.0	10.0 T.
Sweet clover	16			
Native pasture	140		140.0	
Waste	15		15.0	
LIVE STOCK:	*Number.*		*Number.*	
Cows	25	6,250 lbs. B. F.	8	2,000 lbs. B. F.
Other cattle	(a) 17		20	11,000 lbs.
Poultry	250	2,025 doz. eggs 1,250 lbs.	70	595 doz. eggs 500 lbs.
Brood sows	3	4,800 lbs. pork	3	5,000 lbs. pork
Horses	7		8	
Expected Sales.				
CROPS:	*Quantity.*	*Value.*	*Quantity.*	*Value.*
Corn			453 bus	$317
Kafir			97 bus.	68
Timothy and clover			11.2 T.	124
Prairie hay			22.0 T.	176
Alfalfa	19.5 T.	$292		
LIVE STOCK AND PRODUCTS:				
Whole milk	5,125 lbs. B. F.	$2.755	1,353 lbs. B. F.	$727
Butter fat	665 lbs.	253	445 lbs.	168
Veals	11	176		
Cows or heifers	9	410	11,000 lbs.	715
Eggs	1,800 doz.	360	360 doz.	72
Poultry	1,130 lbs.	203	230 lbs.	41
Pork	4,400 lbs.	374	4,600 lbs.	391
Totals		$4,823		$2,799
Expenses.				
Purchased feed		$240		$203
Live stock expense		502		274
Lime		60		
Crop expense		207		196
Machinery charge		388		388
Farm upkeep		176		172
Miscellaneous		120		120
Taxes		291		260
Hired labor		740		300
Total		$2,724		$1,913
Receipts less expense		$2,099		$886
Products used in home		260		260
Farm earnings		2,359		1,146
Interest on $22,400 @ 5%		1,120	Int. on $20,000	5% 1,000
Return to family		1,239		146

(a) Live stock units.

Live stock to consume the farm-grown feed and utilize the pasture would probably mean an increase in the number of dairy cows, with little change in the number of other cattle kept. A larger flock of poultry may well be carried on a farm of this size.

The crop and live-stock enterprises as outlined in Table XXI would have feed crop sales but would receive practically all income from live-stock and live-stock products. Under the typical system, while returns from cows are greater than from other enterprises, sales of other cattle and crop sales are also important. However, the gross income from the typical farm is much smaller.

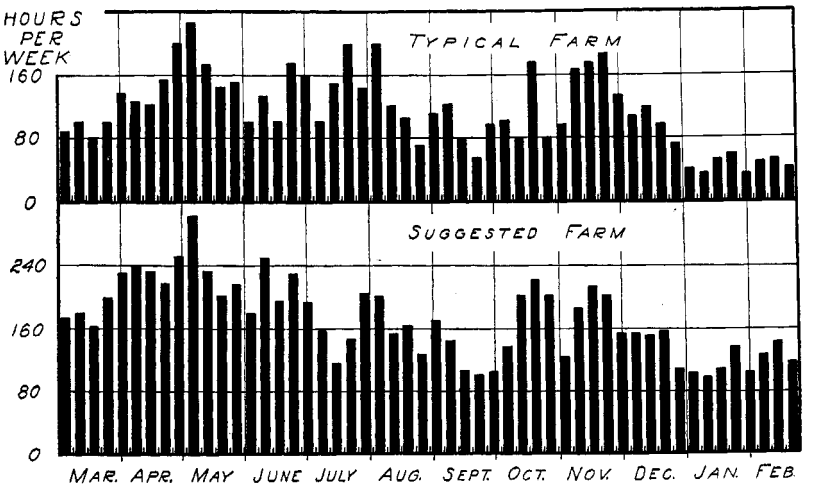

FIG. 15.—Distribution of man labor by weeks on 320-acre typical and suggested farms

Expenses would be higher on the more intensely operated farm. More feed would be purchased, live-stock expenses, which include milk hauling, would be almost doubled, more alfalfa and sweet clover seed, fertilizer, and lime would be needed, and more labor would be required. The crops and live stock included in the suggested organization would require the labor of two men for practically the entire year, with additional labor during the crop season. A charge for this extra labor is made in expenses charged to the farm.

Total labor used on these farms is estimated from the probable requirements previously shown. On a farm with 25 head of cows some saving in labor over these expected quantities might be made. The use of a milking machine and other labor-saving equipment

would reduce the labor materially. On both the suggested and the typical farm some saving in field labor, as compared to the acre requirements on smaller farms, is possible through the use of larger units of machinery. (Fig. 15.)

A comparison of estimated returns shows that by using the suggested system the farm income would probably be nearly double that obtained under the typical way of handling the farm. After deducting 5 per cent interest on the necessary investment, the estimated return to the operator and his family is $1,239 as compared to $146 from the typical farm.

APPLICATION OF SUGGESTED ORGANIZATION TO FARMS IN THIS SECTION

The systems of farming outlined in this bulletin are based on essentially the same type of organization for all sizes of farms. These systems are being followed closely enough by the most successful farmers in southeastern Kansas to demonstrate the practicability of the general plan. It is not to be presumed, however, that the systems as given would prove more successful under the management of every farmer or that they could be put into operation on every farm. Each farm presents separate problems in organization and variations from the suggestions should be made to meet particular conditions. In some cases the best organization for a particular farm may be quite different from the organization outlined.

The organization of each farm must be planned by the manager of that particular farm. The most profitable combination of crops and live stock will depend on the ability of the operator with the different lines of production as well as on the adaptation of his land to the crops and pasture.

An operator who has better than average success with poultry may profitably increase this enterprise on his farm. Other enterprises with which he is particularly successful may be favored in the same way. Soil fertility and the topography of the farm will affect the proportion of crops to pasture and the cropping system to be followed. A farm with a large proportion of good land suited for cultivation can be organized for more intensive operation than a farm with a larger proportion of the land in pasture. A farm with land which is not adapted to growing alfalfa may have a larger proportion of other crops such as annual legumes or sweet clover, and a rotation including alfalfa may be impractical.

Variations from the suggested organization are to be expected but

the type of soil, topography, and market conditions common in this section indicate that the farming systems outlined should suggest improvements in organization to many farmers.

Putting the Suggested System into Operation

The organization of farms for dairy production has been given as if they were already in operation, yet the operator of a typical farm would have to change his farming practices somewhat, make some alterations in the farm layout, and increase his capital investment before a similar plan could be put into practice. The more important changes in converting a typical organization to the one suggested are: (1) fitting the land for legumes and (2) obtaining good cows and providing barn room for them.

Much of the land in this section must be treated with lime before alfalfa or sweet clover can be grown successfully. Acid phosphate and barnyard manure may also be needed to secure best results. It would require time and expense to get the crop land of the farm in condition to include alfalfa, or even sweet clover in a regular rotation.

Good cows are essential to profitable dairying as returns from low-producing cows are always low. It is often impractical to purchase a herd of high-producing cows outright, and most farmers would probably find it advisable to build up a herd through the use of good sires and by retaining the most promising heifers in the herd. A change from a general farm to one specialized in dairying would, in many cases, require added investment for a dairy barn and facilities to care for the product. A silo and silage equipment would need to be added to the equipment of many of the general farms.

The supplementary enterprises such as poultry and hogs are carried out on a smaller scale and could be attained with little difficulty. Since few farms are equipped to care for 200 hens, a poultry enterprise of this size would require the addition of a suitable poultry house and equipment if the efficiency of production assumed in the standard was attained.

Some changes in the farm layout would eventually result from the adoption of the cropping system outlined.

Variations from the Suggested Organization

Even when an adapted system of farming was worked out and put into operation on a farm it is not to be expected that the same balance between enterprises would be maintained each year. A

failure to secure a suitable stand of alfalfa or clover would necessitate shifts in the cropping system, but would not necessarily upset the long-time plan. Similarly a low yield of crops would bring about temporary changes in the live-stock program, depending upon relative prices of feed and prices of live stock or live-stock products.

Minor shifts in organization will also be made in response to changes in price relations. In years when high prices for pork or poultry products are expected these enterprises may be expanded profitably even though the expansion in these lines does result in decreasing dairy production.

Some operators in considering the cyclical fluctuations of prices may wish to shift production to meet the expected prices for certain products. Such shifts should be made in the light of prices expected at the time the product will be ready for market rather than in response to prices at the time the shift is made. Such a program. if successful, will result in larger returns, but carries with it a higher degree of risk, because of increasing operating costs due to shifting the lines of production.

APPENDIX

The tables in the appendix give some additional information concerning certain phases of the farm business in 1926. Tables XXII to XXVII, inclusive, are concerned with dairy cattle; Table XXVIII with poultry; Table XXIX with live-stock products used in the household; Table XXX with distribution of all man labor on the farm; and Table XXXI with the distribution of all horse labor on the farm.

Production by Months.—Table XXII shows the average production and the feed and labor requirements for the 14 farms by months. The average for the year is the same as in Table II. The labor does not include "all stock" labor so will not check with Table II in this respect unless this is taken into consideration. "All stock" labor includes labor which could not be charged directly to any one class of live stock but had to be distributed on some arbitrary basis such as the number of live-stock units. The quantity was small as is shown in Table XXVII.

The month of highest production was May, while that of lowest production was February. The same months were high and low, respectively, in 1925. The heaviest feeding of grain and concentrates combined was in January, March, and February in the order named. The lowest feeding was in May and June.

Summer and Winter Production.—In Table XXIII, May to October, inclusive, are called summer months and the others winter months. During the summer months the average number of pasture days per cow was 178, while during the winter period it was only 22. Although the production averaged 116 pounds of butter fat per cow during the summer months as compared with 104 pounds for the winter period, the feed per cow was much less as shown in the table. The five farms ranking highest in total production were highest in both winter and summer.

Value of Production and Cost of Feed per Cow.—Table XXIV shows the value of production and cost of feeds, the quantities of which were shown in Table II. To make the figures comparable for all farms, the cost of hauling milk has not been deducted from the sales on any of the farms. If the net figures were reported, the hauling was added in. Used products include those fed and used in the home. The margin over feed cost is the difference between the total value of production and the total feed cost.

Value of Production and Cost of Feed per Cow by Months.—The headings in Table XXV are the same as in Table XXII, but instead of giving an array for individual farms the average of all farms is given by months. The averages for the year are the same as the averages on Table XXIV. The quantities of feeds, the values of which are given here, may be found in Table XXII. The average margin per cow rises from $3.84 in March to $8.20 in May, and then gradually declines to $3.02 in February.

Effect of Season Upon Margin.—Table XXVI gives an array of the values of production, feed costs, and margin of production over feed cost for winter and summer. The values here correspond to the quantities given in Table XXIII. The average margin in summer was $38.37, ranging from $31.26 to 872.97. The average margin in winter was 522.71 ranging from a minus mar-

gin of $4.40 to a plus margin of $53.39. The value of production in winter and summer was practically the same so the greater part of the variation was due to differences in feed cost. While the summer production was cheaper, those farms having a large annual margin showed a good winter margin also.

Effect of Season Upon Labor Requirements. — Table XXVII shows the average labor requirements of each farm and the average for all farms for winter and summer. For all farms the difference in labor in summer and winter was only about two hours. The greatest advantage from a labor standpoint for summer production was on farm No. 11. On this farm the production in winter of 71 pounds of butter fat required 102 hours per cow, while a production of 129 pounds of butter fat in summer required the use of only 74 hours per cow. On this farm 70 per cent of the calves were born from March to July, inclusive. A large quantity of rough feed was fed.

Production, Feed, and Labor by Months per 100 Hens. — Table XXVIII shows the production of poultry and eggs per 100 hens by months. The feed and labor requirements are also shown. The averages for the year, except for labor, are the same as shown in Table VI. The average labor for the year does not include "all stock" labor.

Live-stock Products. — Table XXIX gives the quantity and value of live-stock products furnished the household by the farm. On 15 farms the average value of all products was $172.38. This varied from $69.60 to $353.52. When 1925 and 1926 are combined, poultry products form 28.3 per cent of the total; dairy products, 47 per cent; pork, 12.2 per cent; and beef, 2.5 per cent.

Distribution of Labor. — The distribution of man labor is given in Table XXX and that of horse work in Table XXXI. Hours spent for household purposes and garden are included in man labor but personal tasks are excluded, Both crop acres and live stock units are given on the tables for the sake of comparison. The per cent distribution is as follows:

	Man hours.	Horse hours.
Maintenance	10.48	7.59
Crops	28.83	83.10
Live stock	60.59	9.31
	100.00	100.00

Not only the number of crop acres and live-stock units are responsible for the hours worked, but the kind of crops grown, the kind of live stock kept, the type of equipment, the efficiency of labor and other factors must be considered.

TABLE XXII.—FEED AND LABOR USED PER COW BY MONTHS IN PRODUCING BUTTER FAT

(Average of 14 farms, Bourbon county, 1926.)

MONTH.	Number of cows.	Butter fat.	Grain.	High-protein concentrates.	Medium-protein concentrates.	Alfalfa.	Dry roughage.	Silage.	Pasture.	Labor.	
										Man.	Horse.
		Lbs.	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Days.*	*Hrs.*	*Hrs.*
March	235	20	138	25	23	179	200	828	1	9.52	.78
April	227	20	123	25	28	174	161	665	9	9.73	.80
May	225	24	62	11	44	16	.....	38	31	9.40	.38
June	225	21	51	2	67	9	.....	.....	30	8.85	.24
July	214	20	46	2	74	9	.....	19	31	10.13	.12
August	214	17	85	.....	41	116	.....	75	29	10.02	.03
September	211	17	92	2	38	11	9	.....	30	9.89	.12
October	210	17	60	18	59	60	26	186	27	10.22	.35
November	204	17	74	29	51	74	272	716	9	10.00	.80
December	212	16	110	29	24	127	248	917	3	9.85	.26
January	216	17	158	32	23	207	259	963	1	10.41	.91
February	235	15	139	21	19	197	206	898	.....	8.94	.71
Average for year	219	220	1,156	197	487	1,098	1,386	5,354	198	116.78	5.55

TABLE XXIII.—COMPARISON OF PRODUCTION AND FEED PER COW IN WINTER AND SUMMER

(Bourbon county, 1926.)

	Farm No.	Number of cows.	Pounds B. F.	Grain.	High-protein concentrates.	Medium-protein concentrates.	Alfalfa.	Other dry roughage.	Silage.	Pasture.	Cash costs.
				Lbs.	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Days.*	
WINTER	12	12.00	140	500	92	279	808	1,583	6,167	9	$4.04
	18	7.67	141	436	52	309	1,467	522	5,476	35	5.15
	17	7.83	144	1,089	198	.....	1,533	1,149	5,875	26	1.38
	1	44.83	135	702	191	489	1,182	.....	5,532	31	2.09
	3	23.00	132	857	146	.....	1,348	522	6,087	37	8.45
	6	15.00	122	974	158	.....	967	933	7,733	20	11.35
	19	11.67	105	1,135	180	17	407	2,057	4,456	29	6.20
	15	9.67	96	1,279	310	.....	1,448	2,534	3,413	9	.33
	21	5.67	84	830	313	.....	1,764	2,822	6,702	.....	5.88
	11	9.67	71	1,755	155	103	615	5,533	.....	20	4.50
	2	29.00	88	659	291	267	914	672	4,000	18	.04
	9	13.67	47	86	29	.....	585	4,572	.....	15	.05
	13	6.17	68	325	16	.....	648	972	5,024	31	.39
	8	25.67	49	564	35	.....	390	1,247	6,584	10	1.40
Average:											
221.52 cows for 1926	.....	.....	104	757	161	165	969	1,336	4,989	22	3.38
283.01 cows for 1925	.....	.....	103	768	115	146	1,192	1,323	4,176	15	3.03
SUMMER	12	11.17	155	72	36	528	.....	.....	537	167	2.06
	18	6.00	140	862	17	658	750	.....	1,500	158	8.74
	17	7.67	135	146	23	.....	456	261	978	174	1.87
	1	45.17	131	557	29	867	868	.....	531	174	1.27
	3	23.00	126	456	45	83	.....	.....	478	178	9.13
	6	15.50	105	593	54	6	290	.....	.....	184	10.50
	19	10.33	111	301	29	.....	.....	242	.....	177	8.78
	15	10.17	114	842	57	.....	.....	.....	.....	184	1.92
	21	6.00	124	497	150	33	542	.....	.....	178	6.91
	11	10.00	129	978	70	20	.....	.....	.....	184	8.34
	2	30.33	99	299	39	612	.....	.....	.....	184	.18
	9	13.83	104	.....	.....	.....	.....	.....	289	184	.12
	13	5.67	83	.....	.....	18	.....	184	353	184	.07
	8	21.67	82	.....	.....	.....	92	138	185	173	1.18
Average:											
216.51 cows for 1926	.....	.....	116	395	35	324	119	35	312	178	3.64
262.66 cows for 1925	.....	.....	116	223	27	172	578	480	1,140	127	3.72

TABLE XXIV.—VALUE OF PRODUCTION AND COST OF FEED PER COW

(Bourbon county, 1926.)

FARM NO.	Number of cows.	Products sold.	Products used.	Total production.	Grain.	High-protein concentrates.	Medium-protein concentrates.	Alfalfa.	Other dry roughage.	Silage.	Pasture.	Total feed cost.	Margin over feed cost.
12	11.58	$163.61	$17.55	$181.16	$6.78	$2.23	$10.22	$6.15	$4.62	$16.93	$8.52	$55.45	$125.71
18	6.83	147.25	24.14	171.39	15.86	1.82	29.55	17.72	1.76	17.42	8.51	83.64	87.75
17	7.75	137.42	27.46	164.88	13.78	4.49	.....	13.33	1.81	17.12	9.75	60.28	104.60
1	45.00	126.74	17.91	144.65	14.76	3.83	16.37	10.21	.....	15.11	10.38	70.66	73.99
3	23.00	117.16	19.06	136.22	15.68	2.95	1.12	7.32	.52	16.41	10.80	54.80	81.42
6	15.25	105.78	13.61	119.39	18.16	3.51	.21	8.18	2.36	19.01	10.31	61.74	57.65
19	11.00	89.37	23.26	112.63	16.59	3.91	.25	3.27	5.30	10.82	9.81	49.95	62.68
15	9.92	63.74	32.39	96.13	24.56	6.32	.....	7.26	4.94	5.82	9.83	58.73	37.40
21	5.83	84.33	22.88	107.21	15.24	7.77	.38	16.96	6.13	16.30	9.16	71.94	35.27
11	9.83	77.09	23.05	100.14	32.55	3.82	1.59	4.39	8.04	.....	10.25	60.64	39.50
2	29.67	78.58	16.74	95.32	12.01	5.49	9.53	6.24	.99	8.59	10.26	53.11	42.21
9	13.75	42.67	26.36	69.03	.92	.55	.....	4.22	8.32	.29	10.16	24.46	44.57
13	5.92	41.11	26.88	67.99	3.65	.30	.24	4.05	1.43	12.84	10.24	32.75	35.24
8	23.67	66.03	1.27	67.30	6.72	.67	.....	3.21	3.71	16.37	8.66	39.34	27.96
Average:													
219.00 cows for 1926	.....	98.47	18.35	116.82	13.61	3.39	6.07	7.49	2.69	12.74	9.93	55.92	60.90
272.83 cows for 1925	.....	98.74	16.34	115.08	12.49	2.98	4.97	11.80	4.13	12.96	6.78	56.11	58.97

TABLE XXV.—VALUE OF PRODUCTION AND COST OF FEED PER COW BY MONTHS

(Average of 14 farms, Bourbon county, 1926.)

MONTH.	Number of cows.	Products sold.	Products used.	Total production.	Grain.	High-protein concentrates.	Medium-protein concentrates.	Alfalfa.	Other dry roughage.	Silage.	Pasture.	Total feed cost.	Margin over feed cost.
March	235	$8.60	$1.49	$10.09	$1.52	$0.50	$0.30	$1.38	$0.45	$2.07	$0.03	$6.25	$3.84
April	227	8.75	1.33	10.08	1.58	.50	.36	1.19	.33	1.51	.43	5.90	4.18
May	225	10.09	1.41	11.50	.74	.23	.56	.12	.....	.09	1.56	3.30	8.20
June	225	9.12	1.32	10.44	.64	.03	.83	.07	.....	.....	1.50	3.07	7.37
July	214	8.42	1.08	9.50	.57	.05	.88	.07	.....	.05	1.55	3.17	6.33
August	214	7.41	1.03	8.44	1.10	.....	.50	.12	.....	.10	1.49	3.31	5.13
September	211	7.82	1.16	8.98	1.22	.03	.47	.08	.01	.....	1.49	3.30	5.68
October	210	8.06	1.44	9.50	.81	.28	.70	.39	.06	.46	1.33	4.03	5.47
November	204	7.88	1.92	9.80	.88	.45	.61	.54	.54	1.73	.44	5.19	4.61
December	212	7.38	1.89	9.27	1.18	.45	.30	.86	.48	2.24	.17	5.68	3.59
January	216	7.67	2.57	10.24	1.77	.55	.33	1.27	.46	2.25	.05	6.68	3.56
February	235	7.11	1.71	8.82	1.50	.33	.27	1.27	.32	2.11	.....	5.80	3.02
Average for year	219	$98.47	$18.35	$116.82	$13.61	$3.39	$6.07	$7.49	$2.69	$12.74	$9.93	$55.92	$60.90

TABLE XXVI.—COMPARISON OF VALUE OF PRODUCTION AND COST OF FEED PER COW IN WINTER AND SUMMER

(Bourbon county, 1926.)

	Farm No.	Number of cows.	Total production.	Grain.	High-protein concentrates.	Medium-protein concentrates.	Alfalfa.	Other dry roughage.	Silage.	Total pasture.	Total feed cost.	Margin over feed cost.
WINTER	12	12.00	$90.49	$5.61	$1.57	$3.65	$5.94	$4.45	$15.42	$0.46	$37.10	$53.39
	18	7.67	88.98	4.89	1.38	7.45	11.28	1.56	12.58	1.76	40.90	48.08
	17	7.83	88.49	11.86	3.58	.....	9.83	1.40	14.69	1.13	42.49	46.00
	1	44.83	76.10	7.62	3.36	6.02	9.11	.....	13.83	1.54	41.48	34.62
	3	23.00	74.00	9.60	2.17	.....	7.33	.52	15.22	1.91	36.75	37.25
	6	15.00	68.26	10.72	2.65	.....	6.27	2.40	19.33	.98	42.35	25.91
	19	11.67	57.37	12.16	3.21	.23	3.08	4.46	10.20	1.43	34.77	22.60
	15	9.67	46.21	14.12	5.51	.....	7.45	5.03	5.97	.42	38.53	7.68
	21	5.67	46.15	9.05	5.30	.....	13.14	6.30	16.76	.....	50.55	—4.40
	11	9.67	37.31	19.71	2.67	1.28	4.46	8.17	.....	.90	37.19	.12
	2	29.00	46.47	8.49	4.97	3.03	6.38	1.01	8.79	.88	33.55	12.92
	9	13.67	23.63	.92	.56	.....	4.24	8.37	.....	.77	14.86	8.77
	13	6.17	33.31	3.51	.28	.....	3.89	1.38	11.51	1.38	21.95	11.36
	8	25.67	27.22	6.20	.61	.....	2.38	3.19	14.94	.51	27.83	—.61
Average:												
221.52 cows for 1926	.....	.....	58.29	8.49	2.77	2.14	6.58	2.60	11.91	1.09	35.58	22.71
283.01 cows for 1925	.....	.....	56.07	8.88	2.34	2.29	7.91	3.08	10.19	.70	35.39	20.68
SUMMER	12	11.17	90.60	1.01	.63	6.67	.....	.....	.98	8.34	17.63	72.97
	18	6.00	81.36	11.81	.31	13.86	5.75	.....	3.75	7.44	42.92	38.44
	17	7.67	76.27	1.83	.88	.....	3.42	.39	2.31	8.70	17.53	58.74
	1	45.17	68.59	7.15	.48	10.33	1.13	.....	1.33	8.81	29.23	39.36
	3	23.00	62.22	6.07	.78	1.12	.....	.....	1.19	8.89	18.05	44.17
	6	15.50	51.40	7.49	.89	.21	1.98	.....	.....	9.20	19.77	31.63
	19	10.33	54.92	3.94	.54	.....	.....	.60	.....	8.83	13.91	41.01
	15	10.17	49.82	10.53	.92	.....	.....	.....	.....	9.19	20.64	29.18
	21	6.00	60.57	6.26	2.54	.37	4.06	.....	.....	8.90	22.13	38.44
	11	10.00	62.36	12.94	1.18	.32	.....	.....	.....	9.20	23.64	38.72
	2	30.33	48.82	3.63	.63	6.42	.....	.....	.....	9.20	19.88	28.94
	9	13.83	45.28	.....	.....	.....	.....	.....	.29	9.35	9.64	35.64
	13	5.67	34.75	.....	.....	.25	.....	.....	.88	9.19	10.32	24.43
	8	21.67	41.27	.....	.....	.....	.69	.28	.18	8.86	10.01	31.26
Average:												
216.51 cows for 1926	.....	.....	58.53	5.08	.60	3.95	.84	.07	.70	8.92	20.16	38.37
262.66 cows for 1925	.....	.....	59.12	3.41	.58	2.69	3.73	.97	2.48	6.29	20.15	38.97

TABLE XXVII.—COMPARISON OF PRODUCTION AND LABOR REQUIREMENTS PER COW IN WINTER AND SUMMER

(Bourbon county, 1926.)

	Farm No.	Number of cows.	Pounds B. F.	Chore labor.		Special labor.		All stock labor.		Total labor.	
				M.	H.	M.	H.	M.	H.	M.	H.
				Hrs.	*Hrs.*	*Hrs.*	*Hrs.*	*Hrs.*	*Hrs.*	*Hrs.*	*Hrs.*
	12	12.00	140	100.54	.....	1.17	1.67	.69	1.37	102.40	3.04
	18	7.67	141	68.35	.....	7.24	.26	.....	.....	75.59	.26
	17	7.83	144	68.45	.....	5.94	6.77	1.28	1.28	75.67	8.05
	1	44.83	135	22.20	.....	2.01	3.44	.77	.31	24.98	3.75
	3	23.00	132	36.69	.....	.70	1.39	.....	.....	37.39	1.39
	6	15.00	122	42.10	.....	8.73	14.67	.93	1.48	51.76	16.15
	19	11.67	105	78.66	5.05	2.31	3.77	2.57	5.14	83.54	13.96
WINTER	15	9.67	96	87.28	.....	1.94	1.65	6.46	10.83	95.68	12.48
	21	5.67	84	53.31	.....	2.33	3.26	1.10	1.90	56.74	5.16
	11	9.67	71	87.49	.....	5.32	10.13	9.51	17.94	102.32	28.07
	2	29.00	88	74.17	.....	4.00	6.90	1.58	4.26	79.75	11.16
	9	13.67	47	35.13	.....	.....	.....	3.44	6.88	38.57	6.88
	13	6.17	68	70.66	.....	.49	.97	.16	.32	71.31	1.29
	8	25.67	49	62.43	.....	.91	.93	6.25	12.25	69.59	13.18
Average:											
221.52 cows for 1926	.....	.....	104	55.61	.27	2.73	4.00	2.31	4.27	60.65	8.54
283.01 cows for 1925	.....	.....	103	69.44	.01	4.69	5.22	3.05	3.50	77.18	8.73
	12	11.17	155	111.19	.....	.....	.....	.....	.....	111.19	.....
	18	6.00	140	63.71	.....	5.50	.....	.....	.....	69.21	.....
	17	7.67	135	58.15	.....	.91	.52	.33	.65	59.39	1.17
	1	45.17	131	22.40	.....	1.85	.....	.05	.....	24.30	.....
	3	23.00	126	32.00	.....	.57	1.13	.....	.....	32.57	1.13
	6	15.50	105	35.61	.....	5.45	7.13	.....	.....	41.06	7.13
	19	10.33	111	81.66	.....	.19	.....	.....	.....	81.85	.....
SUMMER	15	10.17	114	81.42	.....	1.62	1.77	.....	.....	83.04	1.77
	21	6.00	124	61.54	.....	.50	.33	.50	1.00	62.54	1.33
	11	10.00	129	72.05	.....	1.20	1.00	.65	1.30	73.90	2.30
	2	30.33	99	73.87	.....	11.90	3.23	.....	.....	85.77	3.23
	9	13.83	104	43.80	.....	.....	.....	.....	.....	43.80	.....
	13	5.67	83	64.90	.....	.....	.....	.....	.....	64.90	.....
	8	21.67	82	77.97	.....	.....	.....	.35	.....	78.32	.....
Average:											
216.51 cows for 1926	.....	.....	116	55.59	.....	2.84	1.24	.10	.11	58.53	1.35
262.66 cows for 1925	.....	.....	116	70.57	.01	2.90	1.44	1.72	.98	75.19	2.43

TABLE XXVIII.—FEED AND LABOR USED PER 100 HENS IN POULTRY AND EGG PRODUCTION BY MONTHS

(Average of 14 farms, Bourbon county, 1926.)

MONTH.	Number of hens.	Production.		Total grain.	Mill feed and chick feed.	Meat scrap, tankage, etc.	Skim milk.	Labor.	
		Eggs.	Poultry.					Man.	Horse.
		Lbs.	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Hrs.*	*Hrs.*
March	1,881	1,469	5	460	84	14	85	70	2
April	1,840	1,441	20	778	103	5	255	73	2
May	1,819	1,231	34	1,005	165	33	220	65	1
June	1,640	1,079	118	1,040	69	6	189	46	1
July	1,557	897	70	1,015	51	6	68	34	1
August	1,544	593	52	980	45	6	138	38	2
September	1,501	510	137	860	47	8	103	33	2
October	1,463	381	42	926	103	21	73	32	2
November	3,110	258	32	464	77	25	8	15	1
December	3,043	325	10	488	36	15	9	17	2
January	2,946	490	5	631	78	36	18	18	1
February	2,914	718	15	551	88	20	.....	20	1
Weighted average for year	2,105	8,736	449	8,532	959	204	962	418	15

TABLE XXIX.—QUANTITY AND VALUE OF LIVE-STOCK PRODUCTS FURNISHED HOUSEHOLD

(Bourbon county, 1926.)

FARM NO.	Eggs.		Poultry.			Butter.		Milk.		Cream.		Pork.			Beef.			Total value.
	Num.	Value.	Num.	Lbs.	Value.	Lbs.	Value.	Gals.	Value.	Pts.	Value.	Num.	Lbs.	Value.	Num.	Lbs.	Value.	
9	1,982	$42.08	44	132	$25.36	140	$48.44	335.5	$52.64	274	$111.50	3	700	$73.50	.....	.....	.....	$353.52
15	1,350	33.93	18	86	15.28	223	76.36	549.5	109.85	.....	.....	.....	.....	.....	2	525	$42.00	277.42
10	3,840	80.66	17	73	14.48	160	61.76	426.0	88.56	.....	.....	.....	.....	.....	.....	.....	.....	245.46
2	3,087	62.58	28	81	14.29	.....	.....	749.5	114.13	.....	.....	1	250	26.25	.....	.....	.....	217.25
1	3,813	77.23	72	173	30.51	.....	.....	365.0	56.49	.....	.....	1	275	28.88	.....	.....	.....	193.11
6	3,624	72.81	54	176	33.17	.....	.....	378.0	74.48	.....	.....	.....	.....	.....	.....	.....	.....	180.46
19	3,100	65.86	20	62	11.82	24	7.60	349.5	51.64	.....	.....	2	400	42.00	.....	.....	.....	178.92
3	2,863	57.97	37	97	17.75	.....	.....	414.8	75.46	.....	.....	.....	.....	.....	.....	.....	.....	151.18
21	940	20.05	54	159	28.47	110	38.88	100.8	15.82	.....	.....	2	395	41.48	.....	.....	.....	144.70
11	1,684	37.72	42	121	21.91	12	3.93	294.9	42.85	.....	.....	1	300	31.50	.....	.....	.....	137.91
18	2,190	48.15	24	70	13.27	.....	.....	312.0	66.11	.....	.....	.....	.....	.....	.....	.....	.....	127.53
17	3,251	66.85	43	127	23.96	.....	.....	181.0	33.28	.....	.....	.....	.....	.....	.....	.....	.....	124.09
12	1,362	28.39	15	44	7.68	.....	.....	366.5	74.05	.....	.....	.....	.....	.....	.....	.....	.....	110.12
13	1,401	29.49	14	50	9.71	13	5.36	182.5	29.81	.....	.....	.....	.....	.....	.....	.....	.....	74.37
8	1,459	29.22	6	15	2.55	.....	.....	157.8	22.83	.....	.....	.....	.....	.....	1	150	15.00	69.60
Average for 1926	2,396	$50.20	32.5	98	$18.02	45	$16.16	344.2	$60.53	18	$7.43	.7	154.6	$16.24	.2	45	$3.80	$172.38
Average for 1925	2,240	46.48	47	142	26.03	72	25.15	392.0	63.60	.7	.12	1.0	256.7	27.32	.2	93	5.13	193.83
Average for 1925 and 1926	2,307	$48.07	41	123	$22.60	61	$21.29	371.6	$62.29	8.2	$3.26	.9	213.0	$22.57	.2	72	$4.55	$184.63
Per cent of total	.....	26.0	.....	.....	12.2	.....	11.5	.....	33.7	.....	1.8	.....	.....	12.2	.....	.....	2.5	100.0

TABLE XXX.—DISTRIBUTION OF ALL MAN LABOR ON FARMS

(Bourbon county, 1926.)

FARM NO.	Crop acres per farm.	Live stock units per farm.	Real estate.	General farm.	Lime.	Machinery.	Household.	Garden, potatoes, orchard.	Total maintenance.	Crop.		Live stock.	Total labor on farm.	Per cent of total labor for maintenance.
										Field.	Other.			
			Hrs.	*Hrs.*	*Hrs.*	*Hrs.*	*Hrs.*	*Hrs.*	*Hrs.*	*Hrs.*	*Hrs.*	*Hrs.*	*Hrs.*	
1	312	104	391	.....	.....	70	76	23	560	4,487	9	4,205	9,261	6.04
8	158	42	438	18	.....	26	53	63	598	2,762	27	4,963	8,350	7.16
19	140	24	73	.....	.....	25	23	.....	121	1,787	41	3,286	5,235	2.35
21	138	62	816	64	28	153	275	47	1,385	1,772	76	4,059	7,290	18.97
2	137	77	275	.....	.....	84	114	108	581	1,791	143	6,789	9,304	6.24
9	115	40	334	.....	32	49	78	10	503	1,174	57	2,118	3,852	13.06
6	115	30	471	7	54	228	31	30	821	1,756	122	3,336	6,036	13.60
17	110	21	464	8	.....	271	80	93	916	1,392	138	1,993	4,440	20.63
15	103	28	387	85	413	273	329	279	1,766	1,175	119	3,213	6,273	28.15
13	96	26	222	.....	.....	2	29	4	257	717	6	1,876	2,856	8.99
11	90	24	129	.....	11	55	36	52	283	1,357	170	3,576	5,386	5.25
10	83	33	182	.....	52	6	13	26	279	1,276	.....	5,571	7,126	3.91
3	80	39	27	.....	.....	9	43	23	102	1,000	4	2,258	3,364	3.03
12	30	17	386	8	.....	21	78	22	515	749	100	2,929	4,293	11.99
18	15	13	116	7	.....	74	36	36	269	428	6	1,695	2,398	11.21
Average:														
1926	115	39	314	13	39	90	86	55	597	1,575	68	3,458	5,698	.....
1925	105	34	409	22	27	124	132	94	808	1,594	113	3,449	5,964	13.55

TABLE XXXI.—DISTRIBUTION OF ALL HORSE LABOR ON FARMS

(Bourbon county, 1926.)

FARM NO.	Crop acres per farm.	Live stock units per farm.	Real estate.	General farm.	Lime.	Machinery.	Household.	Garden, potatoes, orchard.	Total maintenance.	Crop		Live stock.	Total labor on farm.	Per cent of total labor for maintenance.
										Field.	Other.			
			Hrs.	*Hrs.*	*Hrs.*	*Hrs.*	*Hrs.*	*Hrs.*	*Hrs.*	*Hrs.*	*Hrs.*	*Hrs.*	*Hrs.*	
1	312	104	294	.....	.....	32	49	30	405	9,050	.....	301	9,756	4.15
8	158	42	288	.....	.....	8	.....	48	344	4,867	48	515	5,774	5.96
19	140	24	24	.....	.....	.....	16	.....	40	3,712	30	261	4,043	.98
21	138	62	593	6	55	30	59	37	780	3,518	31	591	4,920	15.85
2	137	77	241	.....	.....	54	24	24	343	3,556	238	862	4,999	6.86
9	115	40	98	.....	64	30	34	20	246	2,296	74	214	2,830	8.69
6	115	30	272	14	108	18	12	18	442	3,803	30	514	4,789	9.23
17	110	21	211	.....	.....	51	52	48	362	2,779	116	154	3,411	10.61
15	103	28	46	.....	200	19	317	130	712	2,150	74	306	3,242	21.96
13	96	26	59	.....	.....	.....	.....	8	67	1,303	12	17	1,399	4.79
11	90	24	23	.....	15	.....	34	73	145	2,978	125	584	3,832	3.78
10	83	33	96	.....	104	12	12	24	248	2,508	.....	833	3,589	6.91
3	80	39	26	.....	.....	.....	24	26	76	1,616	.....	66	1,758	4.32
12	30	17	16	.....	.....	.....	16	16	48	1,231	108	44	1,431	3.35
18	15	13	19	.....	.....	.....	.....	13	32	723	.....	2	757	4.23
Average:														
1926	115	39	154	1	37	17	43	34	286	3,073	59	351	3,769	.....
1925	105	34	157	11	24	22	66	55	335	3,058	73	328	3,792	8.82