

X9(A):813.7351  
GO  
46593

X9(A):813.7351  
GO  
046593

June, 1930

Dhananjayarao Gadgil Library  
GIPE-PUNE-046593

87  
etin No. 270

# The Livestock System in Iowa County

BY J. A. HOPKINS JR. AND R. S. KIFER

*9-26-20*  
*20/12/45*

AGRICULTURAL EXPERIMENT STATION  
IOWA STATE COLLEGE OF AGRICULTURE  
AND MECHANIC ARTS

C. F. CURTISS, DIRECTOR

AGRICULTURAL ECONOMICS SECTION

In Cooperation with Bureau of Agricultural Economics of the  
U. S. Department of Agriculture



AMES, IOWA

X 9 (7): 813. 7351  
46593 GO

## CONTENTS

Summary .....	207
Introduction .....	208
Income from livestock.....	208
Functions of the livestock enterprises.....	208
The hog enterprise.....	211
Type of the enterprise varies with its size.....	213
Costs in the production of hogs.....	215
Causes for high costs.....	216
Variations in requirements on spring and fall pigs....	219
Adjustment of hog enterprise to the farm.....	220
The cattle enterprise.....	221
Influences on the size of the cattle enterprise.....	221
Variations in costs.....	223
Variations in types of cattle enterprises.....	224
Small dual purpose or dairy herds.....	225
The beef producing farm herds.....	227
Farms fattening purchased steers.....	229
Large herds used less labor.....	230
Cattle help maintain soil fertility.....	230
Why the profits on the enterprise vary.....	230
Feeding steers .....	231
Poultry .....	233
Combinations of livestock enterprises.....	235

## Summary

The livestock and livestock products accounted for about 80 percent of the total farm income on 28 Iowa county farms for which records are available during 1925 to 1927. The importance of efficient feeding is emphasized by the fact that the value of feeds consumed comprised about three-fourths of the livestock expenses.

Each of the livestock enterprises tended to fill definite functions in the farm business. The nature of the cattle and hog enterprises tended to vary from farm to farm depending on the type of land, acreages in feed crops and the labor supply.

The size of the hog enterprise varied widely but tended to be adjusted to the number of acres in corn and the amount of labor available. On the smaller farms more fall pigs were raised than on those large farms where the crops needed all available labor in the late summer and fall. Spring pigs were produced with an average of about 50 pounds less of concentrates but with a month more pasturage than fall pigs.

The cattle enterprise was generally organized to make use of the available acreage of pasture. On those farms producing large corn crops, cattle tended to assume the form of a feeding enterprise to consume the surplus of corn above the needs of the hogs.

There was a tendency to feed the cattle only on feed that had been raised on the farm. This was particularly true of the milk cows, which received too little protein supplements. If some good protein supplement such as cottonseed meal or linseed oilmeal or a home grown supplement such as soybeans, had been added to the rations, which consisted mainly of corn and mixed hay with a high percentage of timothy, the butterfat yield per cow would have been increased materially.

In both the hog and cattle enterprises the expense per head for labor and shelter decreased appreciably as the size of the herds increased.

Commercial feeding was practiced on about one-fifth of the farms. On farms with a large percentage of tillable land and a heavy production of corn, cattle were usually fed in winter in order to consume the surplus of corn above the needs of the hogs and to provide occupation for labor. Summer feeding was generally practiced only where there was a large acreage of rough pasture land, or where there was a supply of labor in excess of the crop requirements.

# The Livestock System in Iowa County

BY J. A. HOPKINS, JR., AND R. S. KIFER

The data on which this study is based were obtained from detailed accounting records kept on 28 farms in Iowa county in the three years, 1925 to 1927. Twenty-two records were obtained in 1925 and in 1926, and 18 in 1927. The records were supervised by a field man whose entire time was spent on this work. The project was jointly administered by the Agricultural Economics Section of the Iowa Agricultural Experiment Station and the Bureau of Agricultural Economics of the United States Department of Agriculture. Supplementary data were drawn from the files of the Bureau of Agricultural Economics and from census data.

This bulletin is one of a series of four based on the Iowa County study. Bulletin No. 261, deals with the crop system, Bulletin 264 with horses, tractors and farm equipment, and a fourth bulletin with suggestions for the reorganization of Iowa County farms is to be issued.

## Income from Livestock

Livestock were responsible for about 80 percent of the gross income on the Iowa County route. Table I shows that in 1925 and 1926 the sale of hogs from 21 farms averaged about \$3,000 per farm. In 1927, with smaller production and lower hog prices, sales amounted to \$1,835. Cattle came next with sales of about \$2,000 in 1925 and 1926 and \$2,600 in 1927 when cattle prices were rising rapidly. Sales of livestock products, mostly cream, eggs and poultry, amounted to about \$650, and about \$275 worth of livestock products were used in the household.

In all, the livestock income averaged about \$5,200 in 1927 and \$6,800 in 1925. Direct crop sales averaged only about \$600 per farm for each of the three years. Thus livestock production predominates in Iowa County, and the farm income is dependent on sales of livestock and livestock products.

## Functions of the Livestock Enterprises

The different livestock enterprises must be studied with regard to other parts of the farm business. One of the most important principles of farm management is that the farm business must be considered as a whole. Even tho, for convenience, we shall be forced to examine one enterprise at a time, we must remember that the relationships between enterprises are highly important.

TABLE I. AVERAGE INCOME ON IOWA COUNTY COST ROUTE, 1925-1927

	1925	1926	1927
Number of farms.....	21	21	17
Income from livestock:			
Sales: Hogs.....	\$ 2,954.93	\$ 3,030.20	\$ 1,836.72
Cattle.....	2,061.38	1,900.75	2,640.20
Cream.....	210.91	241.00	223.10
Poultry and eggs.....	328.43	352.91	336.48
Miscellaneous livestock income.....	49.80	190.08	22.97
Livestock products used in household:			
Pork and beef.....	78.20	75.87	74.52
Cream and milk.....	155.20	137.19	111.83
Poultry and eggs.....	81.85	87.59	57.83
Increase in livestock inventories.....	916.13	164.58	-141.45
Total livestock income.....	\$ 6,856.64	\$ 6,160.17	\$ 5,189.60
Crop sales.....	454.54	648.19	717.36
Miscellaneous income.....	200.62	106.78	58.79
Increase in miscellaneous inventories.....	1,000.67	207.12	2,068.25
Gross income.....	\$ 8,512.46	\$ 7,121.26	\$ 8,024.20
Percent from livestock.....	80.8	86.5	64.7

The livestock have certain fairly distinct functions to fill in the farm business. First, and most important, they provide a means of marketing a large part of the crops and particularly those crops which, because of their bulk or low quality, or because of the distance and expense of shipping, are most economically fed on the farm. Livestock offer a means of converting these crops into products of higher specific value thus saving on freight. The livestock system on a particular farm will, therefore, need to be organized with regard to the type of crops raised and the amount of crop by-products such as corn stalks and low grade grains, which need to be changed into livestock products in order to find a convenient market.

A second function of livestock is to furnish profitable employment for labor available on the farm in those seasons when it is not demanded by crop enterprises. This end is served to a noteworthy degree by dairying and cattle feeding and to a lesser degree by the production of hogs.

A third important function of the livestock is that of helping to maintain soil fertility. This is particularly true of cattle, which convert large amounts of roughages into marketable products and incidentally help conserve soil fertility by the production of manure.

Table II shows a classification of the farms according to their livestock systems. The farms were divided arbitrarily into four groups. In all of these hogs consumed the bulk of the corn. On 5 of the 28 farms over 15 percent of the corn

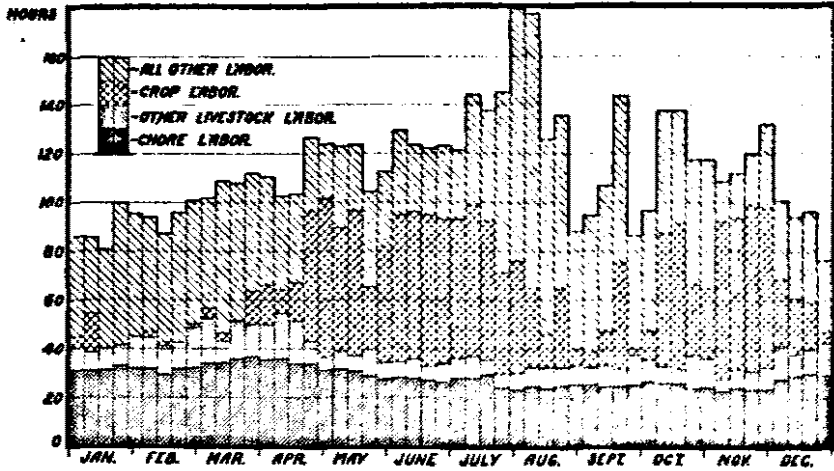


Fig. 1. Seasonal use of labor on 18 Iowa county farms, 1927.

was fed to the dairy or general purpose herd of cattle. On seven farms commercial feeding of cattle took over 15 percent of the corn raised. On four farms the livestock enterprises were small, and over 20 percent of the corn was sold.

Note that in the first three groups of farms the amounts of corn fed to hogs averages very nearly the same. This is also true of the amounts fed to horses. The cattle enterprise seems to be dependent on the preference of the farmer and the

TABLE II. PRODUCTION AND DISPOSITION OF CORN BY TYPES OF LIVESTOCK FARMS

	Over 15% corn to cattle	Over 15% corn to steers	Hog farms	Over 20% of corn sold
Number of farms.....	5	7	11	4
Acres in farm.....	193.7	253.0	172.4	170.8
Acres in crops.....	107.4	139.9	115.2	123.4
Acres in corn.....	56.9	94.0	58.2	61.8
Acres in pasture.....	53.5	54.8	52.0	45.0
Acres in rough land.....	30.3	23.4	16.2	27.4
Corn, source:				
Raised, bu. ....	3,495	4,234	2,879	3,408
Bought, bu. ....	1,811	1,213	385	8
Disposition:				
Sales, bu. ....	331	127	74	994
Fed to:				
Horses, bu. ....	163	105	144	178
Cattle, bu. ....	868	92	185	478
Steers, bu. ....	191	1,470	89	40
Hogs, bu. ....	2,014	2,194	2,027	878
Poultry, bu. ....	173	53	126	80
Sheep, bu. ....	5		29	
Total fed.....	3,414	3,974	2,921	1,663

amount of rough pasture land on a particular farm. Farms with either commercial feeding enterprises or large general purpose cattle enterprises tend to be larger and have more rough land than the hog farms.

In each group hogs consumed more corn than all the other livestock combined. This amounted to half to two-thirds of the corn crop except on farms with large crop sales. The disposition of the oats crop varied more than that of corn. Here the consumption by hogs was of outstanding importance only in the group of hog farms. In other groups horses and cattle were the largest consumers.

### **The Hog Enterprise**

The hog enterprise on the farms studied varied in size from two or three sows up to 38, averaging 15 for the three years. From these sows an average of 114 pigs, including both spring and fall pigs, were sold. The total pork production averaged about 26,000 pounds per farm per year. The number of sows per farm was reduced from 17 in 1925 to 16 in 1926 and to 12 in 1927.

The size of the enterprise was more closely related to the number of acres in corn and the amount of labor available than to any other factors. Fifty-eight hog records were obtained from 26 farms in the course of the three years. Only 7 of these 58 had had more than 25 sows. On the one-family farms, the hog enterprise was seldom larger than 20 brood sows. The reason seemed to be that one man could not care for more sows at farrowing time with the equipment and buildings available. Even when additional labor was available, farmers hesitated to turn over the care of the farrowing sows to the hired men.

On small farms hogs consumed the greater part of the corn crop, while on the larger farms there was a considerable surplus of corn above requirements for hogs. Some of this surplus was sold. On other farms it was fed to cattle, of which there was generally a greater number on the large farms.

This relation of the size of the hog enterprise to the size of the corn crop can be shown by comparing the pork production and corn acreage on different farms. On an average 400 pounds of gain on hogs were produced per acre of corn. But increases in the acreage of corn above the average with no change in labor or equipment resulted in an increased hog production of only 83 pounds per added acre. There is a clearer relationship between the amount of labor available and the size of the hog enterprise. Where the labor used per farm per year was more than the average of 24 months (equivalent to two men working the year round), the hog production increased at the rate of 350 pounds per added month. This



means that a 10 percent increase in the corn acreage above the average with no change in labor or equipment was accompanied by an increase of 2.2 percent in the hog production, whereas a 10 percent increase in the labor supply with no change in corn acreage or equipment was accompanied by a 3 percent increase in hog production.

Table III shows the hog enterprises classified according to the amount of labor used on the farm during the year. The records fell into four more or less distinct classes. The first group comprised farms generally using the labor of only one man. The farm acreage and the size of the hog enterprises were small. These one-man farms produced about 475 pounds of hogs for each acre of corn raised and kept one sow for each 3.7 acres. This was the most intensive pork production of any group.

TABLE III. HOG ENTERPRISES IN RELATIONSHIP TO LABOR SUPPLY

Farm group.....	I 15 mos. labor or less	II 16-25 mos. labor and 10-25 sows	III 26-35 mos. labor and 15-25 sows	IV Over 10 mos. labor and under 10 sows
Number farms, (a).....	10	17	14	6
Average brood sows per farm.....	9.8	17.4	21.6	4.2
Spring pigs per farm.....	57	80	136	29
Fall pigs per farm.....	25	85	35	12
Value buildings used by hogs.....	\$ 641.00	\$ 705.00	\$ 626.00	\$ 782.00
Months labor per farm.....	13.0	20.0	28.7	25.5
Hours labor per cwt. pork.....	2.6	4.0	2.1	2.6
Lbs. concentrates per cwt. live pork, (d)	557	619	475	560
Acres corn per farm.....	36	55	89	92
Lbs. live pork produced per farm.....	17,109	24,793	28,293	9,700
Lbs. live pork per acre corn.....	477	449	311	106
Spring pigs farrowed per sow.....	5.3	6.1	6.3	6.9
Value buildings per sow.....	\$ 65.00	\$ 40.00	\$ 29.00	\$ 181.00
Lbs. live pork produced per sow per year.....	1,755	1,419	1,773	9,303(b)
Percent farms with fall pigs, (c).....	80	59	21	25
Cost per cwt. gain.....	\$ 10.47	\$ 11.94	\$ 8.67	\$ 11.08

(a) The number of farms as used here means the number of annual records completed during the years 1925 to 1927. Thus a farm on the route three years is counted as three in this and following tables.

(b) Including some feeder pigs which were bought.

(c) That is, farms producing 50 percent as many fall as spring pigs.

(d) Including feed to breeding herd as well as to fattening pigs.

No farm with 15 months of labor or less kept over 12 sows. The average was slightly under 10. But about two-thirds of this group produced a relatively large number of fall pigs. These farmers were able to give the small number of hogs better care than was given on larger farms. Consequently the production of live pork amounted to 100 pounds for each 557 pounds of concentrates.

The second group is composed of medium sized farms, using 16 to 25 months of labor per year, averaging 56 acres of corn per farm and keeping 10 to 25 sows. This group averaged 17.4 sows per farm, or one to each 3.2 acres of corn. The pork production amounted to 440 pounds per acre of corn.

Some farmers in this group had difficulty in raising their hogs, and the number of pigs from each sow and the pounds of pork per sow averaged lower than in the first group. The hogs on two farms in this group were affected by disease, which resulted in the use of more labor and in slower gains on the pigs saved. An average of 619 pounds of concentrates were used per 100 pounds of gain with a consequently higher cost of production.

The third group consisted of farms with 26 to 35 months of labor and 10 to 35 sows per farm. Farmers in this group kept an average of 21.6 sows per farm and raised 89 acres of corn, or 4.1 acres for each sow. The men with larger farms obtained better results than the majority of those with medium sized ones. They raised more pigs, produced more pounds of pork per sow and used an average of only 475 pounds of concentrates per hundred pounds of gain. Their total production costs per hundred pounds ran only about three-fourths as high as in the other groups. Relatively fewer fall pigs were produced on farms in this group. Only 3 farms out of 14 produced half as many fall as spring pigs.

The fourth group consists of four farms which were producing crops primarily for sale and kept but few hogs. These raised an average of 92 acres of corn but kept only four sows per farm. The hogs received little attention, and, as a result, both feed consumption and cost per hundred pounds ran high.

#### **Type of the Enterprise Varies with Its Size**

The foregoing shows that the hog enterprise on the large farms is quite different from that on the small farms. The size of the enterprise increases somewhat with the acres of corn and the months of labor used, but seldom are more than 20 sows kept unless a second capable man is available at farrowing time. On the larger farms the number of fall pigs tended to decline as the crop acreage and the demands for labor for crops increased.

Figure 2 shows that the large enterprises required less labor per sow than did the small ones. The herds of 21 to 30 sows required only about half as much time per sow as those of 10 sows or fewer. The relative requirements of labor in different seasons changed from group to group. Since fewer fall pigs were raised in the larger herds, these used less labor in the fall and winter. Thus the herds producing fall pigs filled the

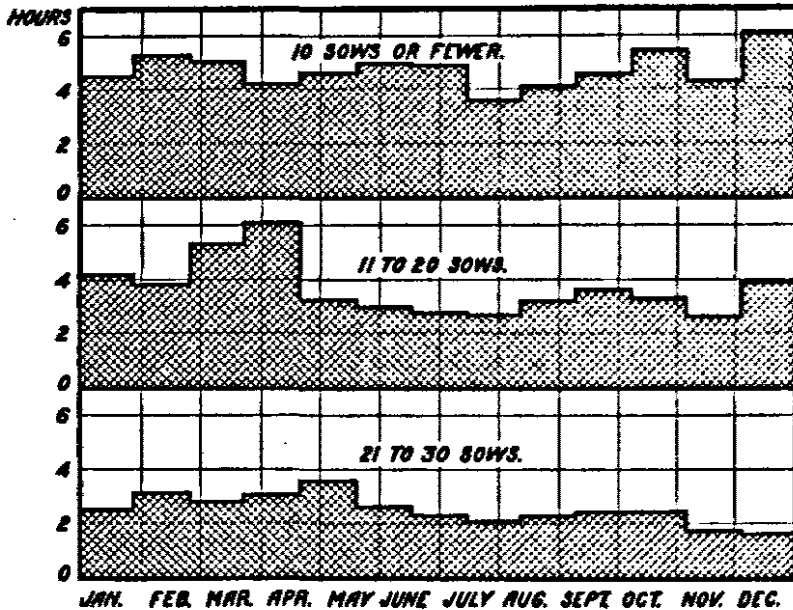


Fig. 2. Labor requirements per sow, by four-week periods.

function of providing winter labor better than those raising spring pigs only.

TABLE IV. AVERAGE COSTS IN HOG PRODUCTION(a)

	Av. 1925-27	Av. 1928	Av. 1929	Av. 1927	Extrema range for 1927	
					Low	High
Total cost per cwt.....	\$ 9.67	\$ 10.00	\$ 9.01	\$ 10.04	\$ 7.40	\$ 18.61
No. sows farrowing in spring per farm.....	15.8	16.6	15.7	12.4	1	28
No. spring pigs raised per sow.....	5.6	5.4	5.0	5.5	4.3	10.7
No. feeder pigs bought.....	19.2	25.7	22.7	5.9		48
No. hogs sold.....	114	117	116	106	5	278
Av. wt. of hogs sold.....	242	246	248	230	166	277
Bu. corn per sow, (b).....	134.4	124.7	133.8	153.6	67.6	220
Requirements per 100 lbs. gain, Feed:						
Tankage, lbs.....	12.4	13.8	12.7	10.0		21.4
Linseed oilmeal, lbs.....				3.2		10.4
Mineral, lbs.....				1.0		18.6
Corn, lbs.....	431.2	395.4	451.1	476.3	359.1	665.1
Oats, lbs.....	38.6	43.4	28.8	31.6		114.5
Skim milk, gals.....	3.5	3.0	3.6	5.4		73.2
Total lbs. concentrates.....	515.5	491.8	624.5	542.8	410.0	735.9
Days of pasture per pig.....	78.1	81.2	81.8	71.3	13.0	153.0
Hours of man labor.....	2.4	2.3	2.5	2.4	.9	4.6

(a) The costs given in this and following tables refer to the entire hog enterprise and include the breeding herd as well as the fattening pigs.

(b) Per sow and litter or litters for the entire production year.

Men with large farms made more complete use of buildings and equipment but differed little from those with small farms in the total investment per farm in buildings used by the hogs. The investment in equipment also varied less than the size of the enterprise. Consequently, the investment per sow was only about half as high on the larger enterprises as on the smaller ones.

**Costs in the Production of Hogs**

The average and the extreme range in costs in the production of hogs may be obtained from table IV. The principal item of cost is for feed. Table IV shows that, taking the group of farms as a whole, about 450 pounds of corn, or slightly over 8 bushels, were fed per hundred pounds of pork produced in

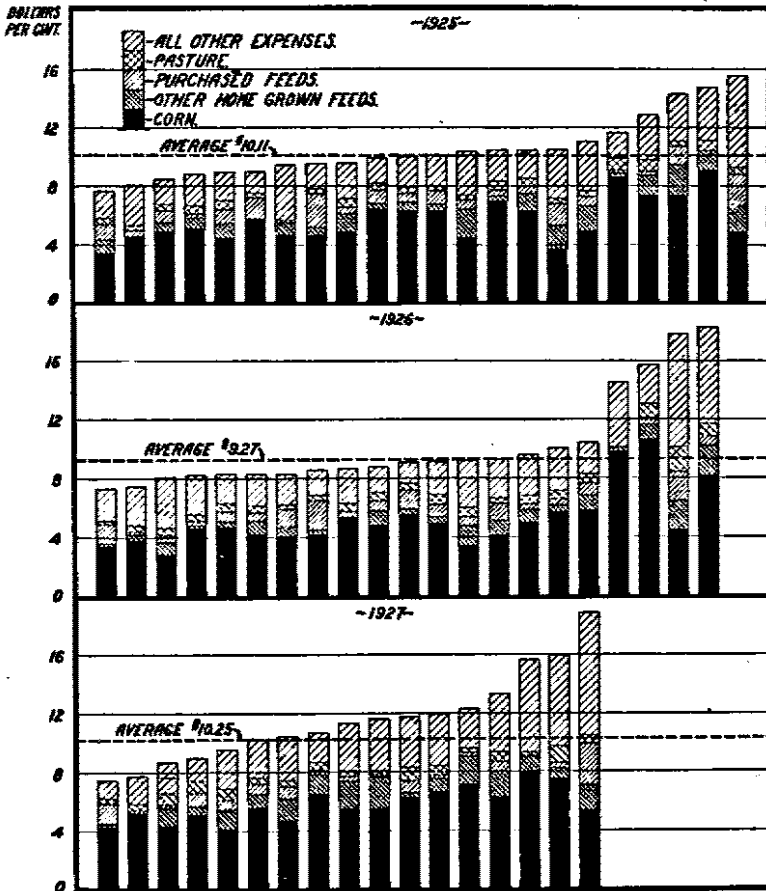


Fig. 3. Variations in cost per cwt. gain in hogs.

1926 and 1927. At 68 cents per bushel, this amounted to about \$5.40 per hundred pounds of gain. Slightly over a bushel of oats was fed per hundred pounds of gain.

The corn and oats were supplemented by tankage, linseed oilmeal and skimmilk. Of these the greatest amount was of tankage; and 12.4 pounds was fed per hundredweight of gain. In 1927 about one-third this amount of oilmeal was used, and the skimmilk fed averaged 3.5 gallons, containing about 2.8 pounds of dry matter. The total of these three protein supplements was equivalent to about 17 or 18 pounds of tankage per 100 pounds of gain. The ratio of supplements to grain was about 1 to 25, which was less than is ordinarily recommended for a dry lot ration. However, the young pigs were usually on pasture for an average of about two and a half months, and less protein supplement was needed.

#### Causes for High Costs

Since feed comprises the greater part of the expense, it is to be expected that the greater part of the saving on cost was accomplished by better feeding practices. This is borne out both by figs. 3 and 4, which show the variation in feed consumption by kinds of feeds. It will be observed in fig. 4 that on the farms with the lowest costs per hundred pounds there tended to be a decidedly lower consumption of corn and a higher consumption of tankage, oilmeal and skimmilk, which made a better balanced ration. This is also shown in table V, which gives the average costs on the four high-cost and the four low-cost farms of each year.

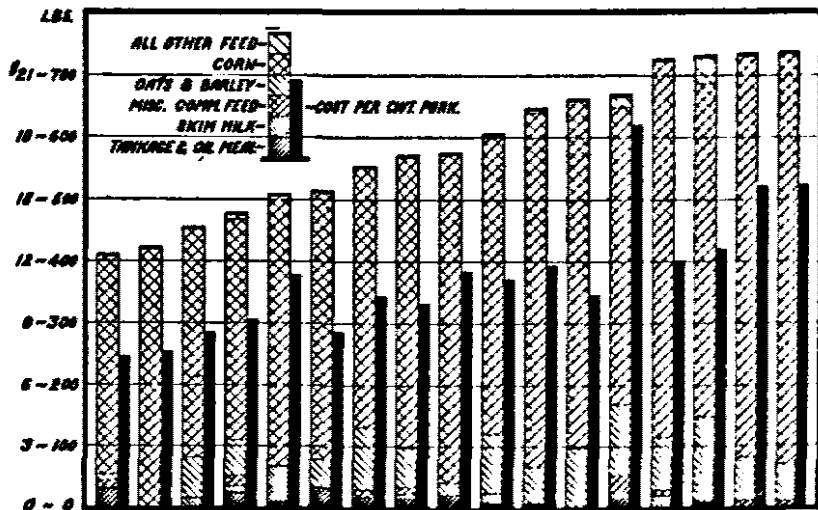


Fig. 4. Variation in feed consumption per hundred pounds of gain.

By adding together the values of the factors of production used on each farm, we obtain an index summarizing the economy of the farmer in keeping down his expenses. This "cost per hundred pounds" is intended merely as an index of performance for comparison between farms and not as showing an absolute cost which stands in any particular relationship to market price.

Table V shows that the cost index for the low-cost hog enterprises averaged \$7.86 for each 100 pounds of gain, while that for the high-cost group was \$15.09. The remaining figures in this table taken together with the data on the practices and deficiencies in operation as given in table VI will help to explain the variation in the cost index.

In the first place the feed consumption on the high-cost farms was about 75 percent higher than on the others. This difference was not caused by the use of less pasture on the high-cost farms, because they actually used about a third more pasture. Part of it was clearly due to careless or wasteful feeding and a part to unbalanced rations, higher death rates, or unthrifty pigs. It will be noticed in table V that the high-cost farms used more skim milk, but only about half as much tankage and linseed oilmeal as the low cost ones. Thus the total of protein supplements fed to the high-cost hogs was about one-fifth less.

One of the most common causes for higher costs was the smaller litters farrowed in the high-cost group. This, of

TABLE V. HIGHEST AND LOWEST PRODUCTION COSTS COMPARED

	Av. 12 low-cost farms	Av. 12 high-cost farms
Feeds used per cwt. gain.....	\$ 7.86	\$ 15.09
Lbs. corn per cwt. gain.....	337	604
Lbs. oats and barley.....	26	83
Lbs. tankage.....	12.8	6.5
Lbs. linseed oilmeal.....	3.4	2.7
Lbs. skim milk, dry basis.....	2.5	7.7
Total protein supp., tankage equiv.....	17.5	14.8
Lbs. minerals.....	.8	1.1*
Total lbs. concentrates.....	406	748
Days on pasture.....	71	90
No. Spring pigs.....	110	57
No. fall pigs.....	40	18
Av. live pigs farrowed per sow.....	5.9	4.6
Pigs weaned per sow.....	5.5	4.0
Percent died after weaning.....	4.5	8.4
Building and land charge, per cwt.....	\$.22	\$.72
Equipment charge, per cwt.....	\$.07	\$.14
Av. weight spring pigs sold.....	216	215
Av. age spring pigs sold, days.....	251	272
Gain per day.....	.88	.80
Hours labor per cwt. gain.....	1.9	5.1

\*Includes one farm on which mineral feeds were used wastefully.

course, goes back to the selection of the breeding stock and suggests either poorer judgment on the part of these farmers, or lack of attention at breeding and farrowing time. The same lack of attention is further reflected in the losses of pigs, which ran about twice as high in the one group as in the other. Table VI shows that on five of the high-cost farms over 20 percent of the pigs farrowed were lost before weaning, and on seven over 10 percent were lost after weaning, whereas no such losses occurred on any one of the low-cost farms. Since about a third of the total cost of pork production is incurred on the breeding herd, this gave the high-cost group a heavy disadvantage from the start.

The amount of time spent on the hogs was less important than the effectiveness with which the work was done. Table V shows that the amount of labor per hundred pounds of gain averaged 5.1 hours in the high-cost group as compared to 1.9 hours in the low-cost group. No one of the low-cost men spent over 3.5 hours, and only two of the high-cost men spent less than this.

The high-cost group also commonly had higher charges for the use of the buildings and equipment, showing that the high labor usage was not attributable to a lack of equipment. It was partly attributable to the smaller size of these enterprises, but mostly to an inconvenient arrangement of buildings and equipment, to unsystematic work and to the fact that on some of the farms much time was spent combatting disease and improving sanitary conditions.

Table VI shows that the poor practices indicated in table VI were uniformly absent from the low-cost farms. Except

TABLE VI. COMPARISON OF PRACTICES IN HOG PRODUCTION

	12	12
	low-cost records	high-cost records
	No. farms	No. farms
Small litters, under 5 pigs.....	2	5
20 percent loss before weaning.....	0	5
10 percent loss after weaning.....	0	7
Total concentrates to sow and litter over 600 lbs. per cwt. gain..	0	10
Ration deficient in protein*.....	4	7
Ration deficient in minerals**.....	5	5
Gain under 0.7 lbs. per day.....	1	4
High equipment and building charge.....	0	7
Labor over 5 hours per cwt. gain.....	0	6
No. farms deficient in 2 points.....	6	12
No. farms deficient in 3 or more.....	0	11
No. farms deficient in 4 or more.....	0	11
No. farms deficient in 5 or more.....	0	5

\*Less than 3 lbs. protein supplements per 100 lbs. of total concentrates, and less than 15 lbs. per 100 lbs. of gain—these limits taken arbitrarily.

\*\*Less than one-half the average ration of minerals.

in regard to minerals and the amount of protein in the ration, only 5 of the 12 low-cost farms were deficient in any of the factors listed. On the other hand, every one of the 12 high-cost farms was deficient in at least two factors, 11 were deficient in four, and 5 in five factors.

#### Variations in Requirements on Spring and Fall Pigs

Table VII shows the difference in the production costs between the farms raising spring pigs only and those raising both spring and fall litters. The two groups differed little in the total cost per hundred pounds or in the total labor requirements per hundred pounds of gain. But the farms with spring pigs produced a hundred pounds of gain with an average of 498 pounds of concentrates as compared to 550 where both spring and fall pigs were raised. However, the spring pigs got an average of 25 days of pasturage more than those in the other group.

The seasonal requirements of the two groups for feed and labor varied quite definitely, as fig. 5 shows. Thus the farms raising spring pigs have their heaviest labor requirements on hogs for only a few weeks in the spring when the sows are farrowing and again some eight to ten months later when the pigs are being fattened for market and sold. Corresponding to the fattening period, the feed requirements of the herd are about half again as high from October to January as from March to September.

With the production of a large number of fall pigs, one labor peak occurs in February and March when the fall pigs are being fattened and when the sows are farrowing the spring pigs. Another less pronounced peak is in September and October when the fall pigs are being farrowed and the early spring pigs are being fattened.

TABLE VII. SPRING AND FALL PIGS—COMPARISON OF COSTS

	Farms with spring pigs only	Farms with fall pigs
Number farms .....	21	20
Number brood sows.....	18.6	14.5
Number spring pigs per farm.....	100	78
Number fall pigs per farm.....	2	66
Pounds live pork produced.....	26,147	29,158
Value buildings used by hogs.....	\$ 679.00	\$ 680.00
Value hog equipment.....	\$ 42.00	\$ 52.00
Cost per cwt. gain.....	\$ 19.16	\$ 19.32
Hours labor per cwt.....	2.7	2.6
Pounds concentrates per cwt.....	498	550
Days pasturage per pig.....	94	69



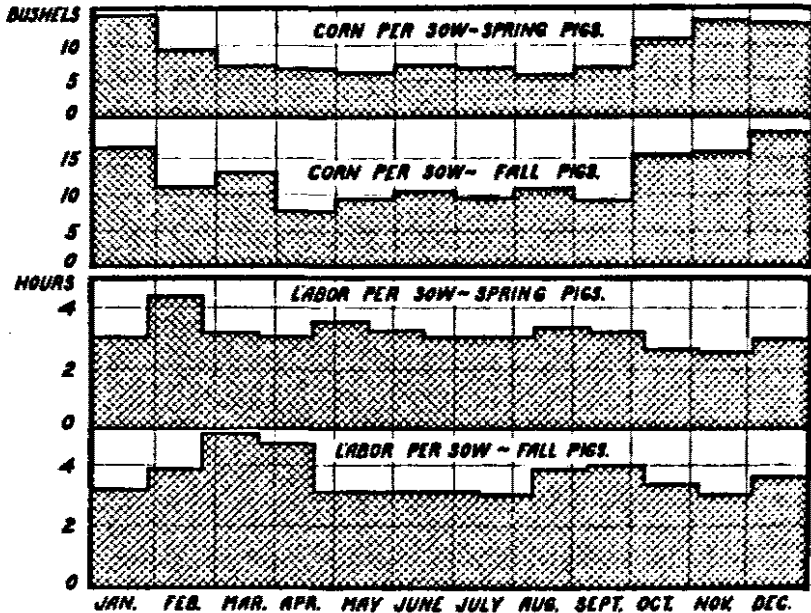


Fig. 5. Labor and food requirements on spring and fall pigs, by four-week periods.

#### Adjustment of Hog Enterprise to the Farm

The conclusion of this section must be that there is a definite relationship between the size and nature of the hog enterprise and the size and type of farm. On the smaller farms, with less corn available, the hog enterprise must be of a size to correspond. Relatively more fall pigs are produced, making more use of the breeding herd but at some increase of labor cost in the care of the fall pigs and some increase in grain requirements. On the other hand, these farms obtain certain advantages by raising fall pigs. They are able to reduce the cost per pig for the maintenance of the breeding herd and make fuller use of any superior breeding stock as well as of hog equipment and buildings.

As the farm and the crop become larger the hog enterprise increases also, but at a slower rate and does not increase beyond the number of sows that the available competent labor can handle at farrowing time. On the larger farms the production of fall pigs tends to decline because the available labor is needed on the crops in the late summer and fall. On the other hand, the larger enterprises obtain the advantages of fuller use of their buildings and hog equipment and are able to care for more hogs with only a small increase in the hours of labor required. As we have seen, these advantages

may be obtained without a loss in feeding efficiency or a reduction in the rate of gain.

Whatever the size of the enterprise, it is clear that the lowest costs are obtainable only by a uniformly high performance. It is necessary to select breeding stock wisely, to plan a well balanced ration, to make full use of a high grade of pasture and to keep a careful watch on the health of the herd. These things are all necessary to obtain a rapid rate of gain and to obtain the most pork for the feed consumed. At the same time much is to be gained by a careful planning of the buildings and equipment for convenience in order to save labor.

### **The Cattle Enterprise**

The cattle enterprise on the Iowa county farms varied even more than the hog enterprise both in size and type. A few farms had no cattle except a couple of milk cows for the use of the family. On most of the farms, however, there were cattle enterprises of various sizes combining the production of beef and butterfat in various proportions.

Cattle are able to convert into a salable product not only the grains but also roughages which could be sold only with difficulty and pasturage produced on land too rough for crops. Cattle, like hogs, make use of labor available during the winter when it is not needed by the crops. This demand for labor, however, remains more nearly constant thruout the winter than in the case of hogs. Cattle also are of more consequence than hogs in helping conserve soil fertility, since cattle produce a large amount of manure from roughages as well as other feeds and since manure from the cattle is generally handled more carefully than that from hogs.

The general purpose cattle enterprise on the greater number of the farms failed to return market prices for the feeds and other cost elements which they required in 1925 and 1926. It was only in 1927, with sharply rising cattle prices, that profits above the expenses figured at market rates were shown on the majority of the farms.

The cattle enterprises involved a total expense amounting to an average of about \$75 per animal unit, as is shown in table VIII. This expense includes about 20 bushels of corn, 7 of oats,  $\frac{3}{4}$  ton of roughage and 45 hours of labor. In addition to these items the cattle used an average of about 28 acres of stalks per farm, or 1.5 acres per head of cattle.

#### **Influences on Size of the Cattle Enterprise**

The size of the cattle enterprise, combining beef and dairy cattle, is largely a matter of choice with the farmer. If the hog enterprise is large, its demand for feed tends to reduce the number of cattle. Thus an increase of one sow was associated with a reduction of about one-half of an animal unit

TABLE VIII. CATTLE—COSTS PER ANIMAL UNIT\*

	Average 1927	Average 1928	Average 1929	Average 3 years
Feed .....	46.87	42.58	42.94	44.06
Labor .....	18.65	13.17	12.78	12.94
Interest .....	5.94	5.14	4.57	5.16
Equipment, buildings and land.....	6.12	5.45	5.06	5.71
Miscellaneous .....	6.65	6.80	7.67	6.98
<b>Total current expense.....</b>	<b>79.19</b>	<b>78.09</b>	<b>71.06</b>	<b>75.25</b>
<b>Physical Costs per A. U.</b>				
Corn, bu. ....	21.8	22.7	15.7	19.9
Oats, bu. ....	6.7	5.8	7.0	7.1
Other concentrates, lbs.....	111.7	78.5	84.0	79.3
Roughage, tons .....	.8	.6	.5	.7
Pasture, months .....	5.7	5.0	6.9	5.6
Silage, tons .....	1.3	1.8	1.2	1.3
Stalks, acres .....	1.6	.9	1.9	1.5
Labor, hours .....	43.2	47.3	45.9	45.6

\*An animal unit was taken as comprising one cow or steer or two yearlings or calves kept on the farm for 12 months.

of cattle on farms of the same size, productivity and labor supply. Pork production 50 pounds above the average of 450 pounds per acre of corn was associated with one less animal unit of cattle per farm. But, on the other hand, some farmers chose to sell the surplus of corn above the needs of the hogs rather than keep many cattle.

As with the hogs, the presence of a supply of labor was one of the larger influences on the number of cattle. An increase of one month in the labor used per farm per year with no change in size of farm was associated with an increase of 1.1 units of cattle. There was some choice, however, as to whether the labor was to be used in caring for cattle or in raising more crops. An increase of 4.4 acres of crops handled per man if labor supply and other factors were unchanged meant a reduction of one animal unit of cattle per hundred acres, or approximately two per farm.

It is often thought that a large acreage of rough land is associated with large cattle enterprises. Rough land, however, has a smaller carrying capacity than smoother, more productive land. Thus, adding 20 acres of rough land to the farm was associated with an increase of 3.3 animal units of cattle, but, at the same time, there was some reduction in the number of cattle per hundred acres.

As long as these other conditions remained constant, there seemed no marked relationship between the size of farm or number of acres of corn raised and the number of cattle kept per hundred acres.

## Variations in Costs

Figure 6 shows that the total expenses per head (animal unit) varied from \$40 to over \$200, but on the bulk of the farms were between \$50 and \$100. About two-thirds of this total was composed of expense for feed which, as shown in table IX, was between \$35 and \$60 on most farms. Labor was the next largest item and generally amounted to between \$6 and \$20. Interest amounted to between \$3 and \$6 for investment in stock interest and \$2 to \$10 for buildings, lots and equipment.

In explaining the causes for these variations in expenses, we shall first consider the size of the herd. Table X shows that all groups of expenses, except interest on the stock, are higher per head in the smaller herds. The decline in the feed

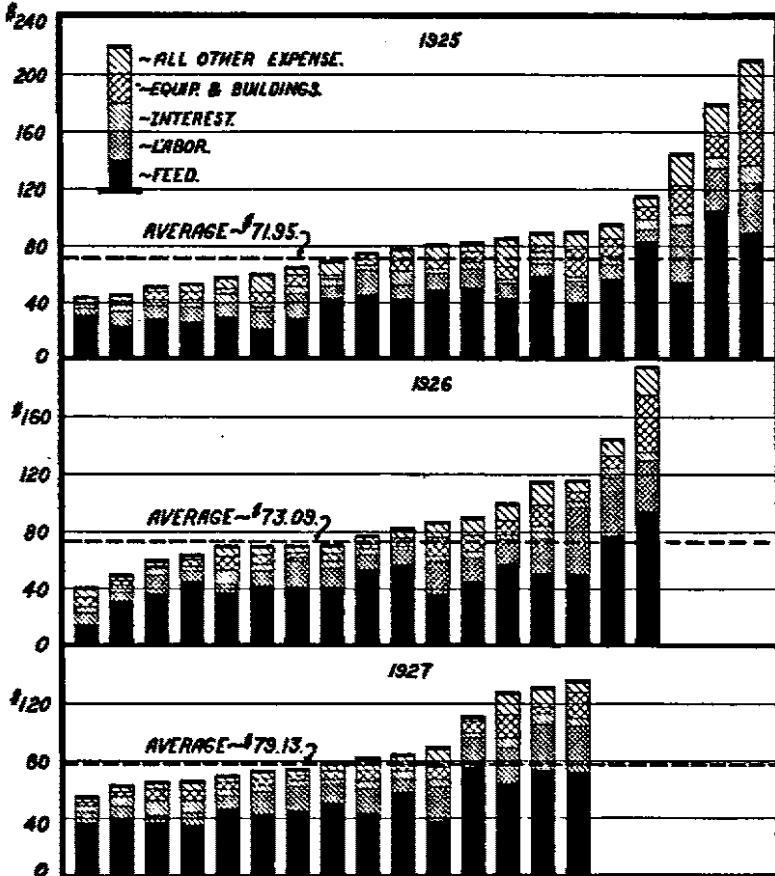


Fig. 6. Variation in costs per animal unit of cattle.

TABLE IX. VARIATION IN EXPENSES ON CATTLE, 52 FARMS, 1925-1927

	Average per animal unit	Extreme variation	Range including % of farms
Feeds .....	\$ 44.06	\$ 14.96—\$108.07	\$ 35—\$90
Labor .....	12.04	2.97— 43.85	0— 20
Interest .....	5.16	2.14— 10.38	2— 6
Equipment, land and buildings .....	5.71	1.06— 46.19	2— 10
Miscellaneous .....	6.98	2.37— 27.27	3— 12
Total expense .....	\$ 78.95	\$ 40.48—\$210.79	\$ 50—\$100

cost is to be attributed largely to the fact that the smaller herds commonly fill a different function from the larger ones, as we shall see later.

The large herds, however, offer some genuine opportunities for economy in the use of labor, buildings and equipment. Roughly, it may be said that labor expense per head was about twice as high in herds of 10 head as in herds of over 20. Beyond this size, however, there was little further reduction in expense.

#### Variation in Types of Cattle Enterprises

The variations in feed and other requirements, and differences in productivity of the cattle cannot be explained simply on the grounds of efficiency, or of size of enterprise. Five more or less distinct types of cattle enterprises were found on Iowa County farms.

A few farms had only two or three milk cows, chiefly to provide milk for the family. About a fourth of the farms had small dairies averaging about 8 cows and, in addition, kept 9 or 10 animal units of other cattle, thus combining the production of butterfat with that of beef. A third group averaged 6.6 milk cows and 15 units of other cattle, thus making the equivalent of slightly over 20 head of aged animals in all. The fourth group was composed of larger beef herds which averaged about 45 animal units and which included an occa-

TABLE X. CATTLE—INFLUENCE OF SIZE OF HERD ON EXPENSES PER HEAD

Size of herd (No. animal units)	Number farms	Average expense for feed	Labor	Interest	Buildings, equipment and lots	Miscellaneous	Total expense
1—9 .....	17	\$ 57.38	\$ 22.42	4.96	\$ 15.06	\$ 12.51	\$ 112.32
10—19 .....	11	47.85	19.61	5.14	8.01	10.22	90.84
20—29 .....	9	48.31	11.75	6.17	4.94	6.40	76.57
30—39 .....	8	39.40	11.45	4.56	4.17	5.74	65.22
40—49 .....	5	37.02	10.76	5.05	4.06	5.57	62.54

sional lot of feeding steers. The fifth group, occurring on about one-sixth of the farms, comprised the commercial feeders. The cattle feeders had an average of about 55 head of steers (34 animal units) and, in addition, kept a small farm herd averaging about 6 head.

TABLE XI. TYPES OF CATTLE ENTERPRISES

	Family cows	Small dairies	Medium sized beef herds* (20-30)	Large beef herds* (30-40)	Commercial feeders
Number of farms.....	4	16	9	18	10
Number milk cows.....	1.9	8.1	6.6	8.7	4.6
Number other animal units.....	2.8	7.8	14.9	31.2	1.9
A. U. steers fed.....	4.7	17.8	21.5	45.1	34.3
Total A. U. cattle.....					40.8
Cattle income:					
Milk and cream.....	\$ 111.00	\$ 637.00	\$ 404.00	\$ 437.00	\$ 419.00
Beef from farm herd.....	\$ 289.00	\$ 414.00	\$ 732.00	\$ 1,406.00	\$ 281.00
Income from steers.....	\$ 143.87			\$ 168.00	\$ 2,946.00
Percent farm inc. from all cattle.....	9	19	23	25	62
Cattle income per acre.....	\$ 2.54	\$ 8.59	\$ 6.20	\$ 10.65	\$ 19.29
Size of farm and use of land:					
Acres in farm, average.....	188	144	256	295	198
Acres corn.....	45	49	82	84	69
Acres pasture.....	57**	37	70	62	51
Percent land rolling or rough.....	43	47	23	37	62
Acres per head (A. U.) cattle.....	35.8	8.1	11.9	5.2	4.8
Corn use:					
Bushels corn to farm herd.....	65	505	568	707	159
Bushels corn to steers.....		117		187	1,447
Percent corn fed to all cattle.....	3	18	14	20	49
Tons roughage fed farm herd.....	4.9	14.2	19.8	19.1	4.2
Tons roughage to steers.....		.6		5.5	16.6
Tons manure per acre.....	.1	.5	.6	.6	1.3

\*Number animal units in the farm herd—feeding steers not included.

\*\*Not fully utilized.

#### Small Dual Purpose or Dairy Herds

The farms with two or three milk cows for the use of the family were generally small in acreage and had either chosen the hog enterprise instead of cattle as a means of disposing of the corn crop, or else, in the year when studied, they were not making full use of the available pasture and were temporarily understocked. The dairy herds were generally found on small farms of a quarter section or smaller, which usually had a fairly high percentage of rolling or rough land. The cattle were on pasture slightly over five months.

The small dairy herds are distinguished from the other groups by the fact that they used more labor per head and produced more butterfat per cow than any other group, except in those instances where a few cows were kept on commercial

feeding farms. The butterfat production averaged 131 pounds as compared to 115 for the beef producing herds, and 55 percent of the cattle income was from dairy products as compared to one-third or less in beef herds. The cows in these herds would, for the most part, be considered dual purpose animals. The production of butterfat per cow was too low for profitable dairy herds. The cattle on most of these farms were neither of a satisfactory dairy nor a highly desirable beef type.

For these small dual purpose or dairy herds it would be highly profitable to select cows with dairy breeding and to give more attention to suitable rations. Table XII shows that an average of 19 bushels of corn, 8.5 bushels of oats and 69 pounds of other concentrates were fed per animal unit to all cattle.

It will be observed that only a small quantity of other grain supplements is used in addition to the corn and oats. This indicates a lack of protein in the ration for milk cows, since the roughage fed was largely timothy and clover hay and corn fodder. On the farms which make any serious attempt to produce butterfat it should be decidedly profitable to provide some protein supplements to balance the ration. A part of the needed protein could be produced on the farm as soybeans, or as clover or alfalfa hay after the soil acidity is corrected by liming. At the prices prevailing in the years of this study it would have required about a 20 percent greater production of butterfat from the same amount of feed for these cattle enterprises to break even financially.

TABLE XII. CATTLE—REQUIREMENTS PER ANIMAL UNIT

	Family cows	Small dairies	Medium sized beef herds	Large beef herds	Fattening purchased feeders
Number of farms.....	4	16	9	13	10
Feed cost.....	\$ 46.45	\$ 43.34	\$ 67.22	\$ 38.37	\$ 53.67
Labor cost.....	14.00	17.75	11.98	9.45	22.44
Interest.....	4.87	4.67	6.09	5.46	4.56
Equipment, buildings and land.....	14.96	5.79	6.51	4.66	10.73
Miscellaneous expense.....	13.96	8.56	9.42	8.48	11.58
Total current expense.....	\$ 106.97	\$ 91.25	\$ 99.85	\$ 62.36	\$ 112.27
Physical costs:					
Corn, bu.....	13.6	19.2	26.4	18.2	24.5
Oats, bu.....	25.0	8.5	4.5	6.3	10.7
Other concentrates, lbs.....	30	69	87	102	68
Roughage, tons.....	1.0	.9	.9	.5	.6
Silage, tons.....	.3	1.2	1.3	1.2	2.6
Stalks, acres.....	3.1	1.2	2.7	1.4	.6
Labor, hours.....	58.9	67.3	40.9	33.1	76.3
Pounds butterfat produced per cow.....	66.6	131.0	116.6	115.3	126.2

### The Beef Producing Farm Herds

Over a third of the farms had beef producing herds of varying sizes. As shown in table XI these were composed of about 6 or 7 milk cows (that is, cows that were milked the greater part of the time) and 12 to 30 animal units of other cattle. These farms have been divided into two groups, those with 20 to 30 animal units in the farm herd, and those with 30 to 40 units. The value of milk and other dairy products sold or used in the household amounted to between \$400 and \$500 for each group. The income from the production of beef was decidedly larger. It averaged \$732 in the smaller herds and \$1,406 in the larger ones. The farms with the large cattle enterprises averaged 256 acres for the medium sized herds and 235 acres for the large herds. This is about 100 acres larger than the farms with the dairy herds.

The larger farms had a larger acreage in pasture for the use of cattle. Most of these farms had less rolling or rough land than the dairy farms, but the larger herds were usually on farms with some rough pasture land.

Figure 8 reflects the tendency for the cattle from the medium sized herds to be sold at a different time of the year from those in the larger ones. There were some sales at nearly all times of the year from each group, but only a couple of farmers with small herds made a practice of selling their cattle in the winter or spring. Most of the cattle on these small farms were disposed of in October and November. The cattle were either started on feed on pasture, or were given a short feed in the fall.

Few sales were made from the larger herds in the winter and late fall. About half of these farmers finished their cattle on pasture and the most common practice was to dispose of the cattle from April to September. This is one explanation for the lower labor requirements and lower feed consumption per head in the larger herds.

This difference in handling results in the difference in the seasonal consumption of feed shown in fig. 7. Where the cattle were fed out in late spring or early summer feed requirements, of course, dropped off sharply when the cattle were sold. The feed requirements, as shown by the curve for the larger herds, then increased again in the late fall as the next lot was started on feed. It will be observed that seasonal labor requirements, as shown in fig. 8, correspond closely to seasonal feed consumption in fig. 7.

Two sets of influences seemed to be at work in determining the time of year when the cattle would be finished. Where the herds were small or where the crop acreage was small labor could be spared from the crops for summer or early fall feed-



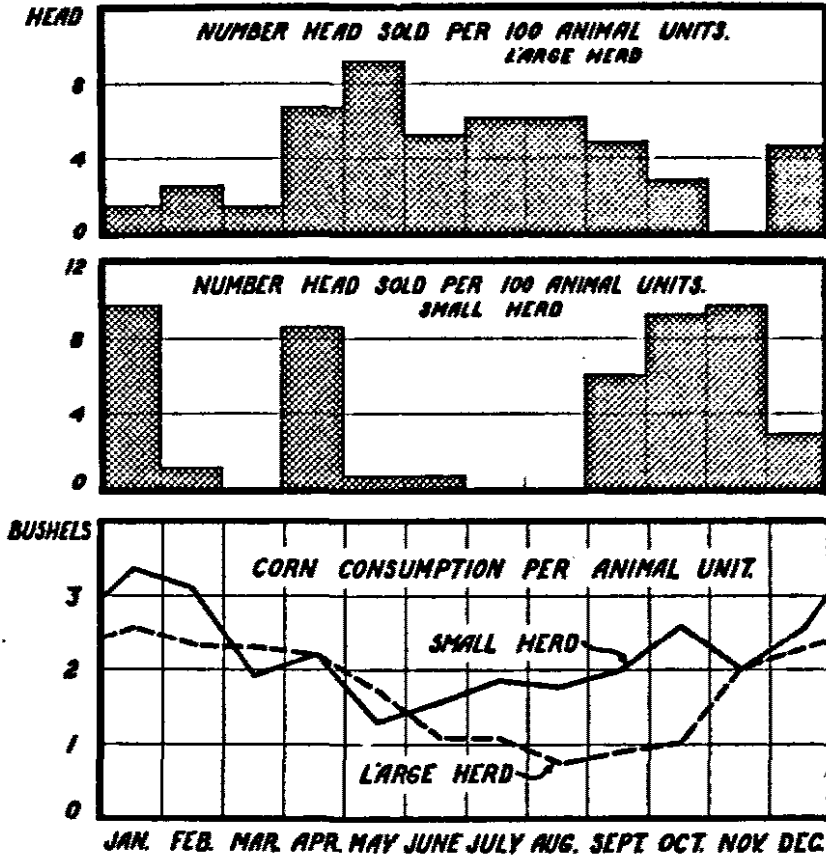


Fig. 7. Seasonal feed consumption and sales of cattle from beef herds.

ing. Herds kept primarily to make use of rough pasture land were more often left on pasture till the end of the season and fed out in the fall or winter.

Table XII shows that expenses per unit on large herds are less than in small ones. There was a tendency to maintain the larger herds as cheaply as possible and let them forage for themselves instead of feeding them heavily on grain. Consequently the grain fed per animal unit is about one-sixth less in large herds than in small ones. The expenses per animal for labor, shelter and some miscellaneous items, vary inversely with the size of the herd. The large herds contained practically twice as many cattle as the medium sized ones, but the labor expense and the charges for the use of the buildings and equipment were only about a half greater.

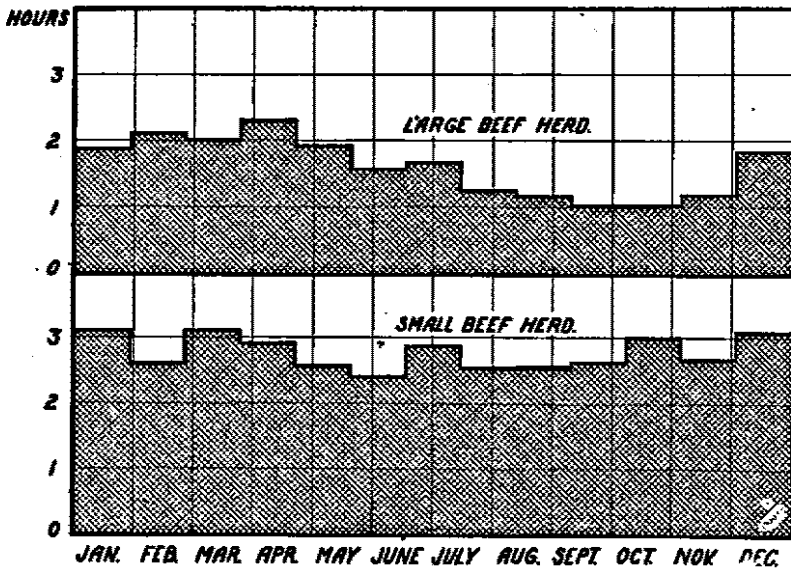


Fig. 8. Seasonal labor requirements of beef cattle.

#### Farms Fattening Purchased Steers

About one-fifth of the farms had commercial feeding enterprises, from which an average of 56 steers were sold per farm per year. This was equal to 34 animal units, since the steers were kept on the farms only part of a year. The feeding cattle, which comprised the principal cattle enterprises on these farms, will be discussed later. On the same farms there were also small farm herds, composed generally of three or four cows mostly to supply milk for the household, and about two units of other cattle.

These small herds are in some respects comparable with the small dairies discussed at the beginning of this section. The total expenses per animal unit averaged \$112 as compared to \$106 on the family cows and \$81 in the small dairies. The labor requirements ran highest with the small herds, amounting to 76 hours per animal unit as against 67 hours for the dairies and 53 hours in the groups of family cows. The butterfat production averaged 136 pounds per cow.

The farms where commercial feeding was found averaged 198 acres, somewhat less than those with the cattle raising enterprises. Farmers practicing commercial cattle feeding had the largest proportion of rolling and rough land of any group and also fed the highest percentage of their corn to cattle, since practically one-half of the corn raised was con-

sumed either by the steers or by farm herds. Thus the most intensive cattle enterprises were found on their farms. They averaged 4.8 acres of land to each animal unit, as compared to 8.1 acres for the dairies, 11.9 on the small and 5.2 on the larger beef producing farms.

#### **Large Herds Used Less Labor**

Figure 8 shows that the large herds used less labor per animal unit than did the small ones. The small dairy herds averaged 67 hours of man labor for each animal unit, whereas the average for the beef herds was about half as much. The small dairies used about seven hours per animal unit each month during the winter and until the beginning of the pasture season. The amount of labor used declined during the summer and was lowest in November when the fewest cows were milked. The smaller beef herds used about three hours of labor per month for each animal unit during the feeding season and about two hours during the pasture season. In the larger beef herds the labor requirements ran about 2 hours in winter and about 1.2 hours in summer for each unit.

#### **Cattle Help Maintain Soil Fertility**

Table XII shows that commercial feeding herds provided about twice as much manure per acre as any other livestock enterprise. This was partly because the enterprise was most important on these farms, and considerable corn and other feeds were purchased. Manure supplied by beef producing herds amounted to about four tons per acre of land in the rotation once each five years. On commercial feeding farms, an eight-ton application could be made each 5 years. With greater care in conservation of manure one-fourth to one-half more could have been applied on most of the farms.

#### **Why the Profits on the Enterprise Vary**

Butterfat production per cow seems the most important single influence on the profits. On the average the income from the cows on these farms failed by \$12.70 per year to equal current prices for feed, labor and charges for equipment and interest. The outcome varied with the prices of feeds and of butterfat. The average butterfat production per cow was 123 pounds. A production of 50 pounds more was needed for the enterprise to break even financially.

The size of the herds was closely related to the returns but was not one of the more important influences. The returns tended to increase with the size of the herd at the rate of \$2.08 per animal unit for each five added milk cows, or 85 cents for each five animal units of other cattle when no change in feeds and production was incurred. This represents mostly

a saving on labor and shelter. Where the applications of labor and investments in buildings used by cattle were increased above the average, greater losses resulted. In both these respects it was clearly the quality and effectiveness of the labor or shelter that counted and not the amount.

It is pointed out elsewhere in this bulletin that these cattle were getting too little protein supplement. One evidence of this is found in the fact that farms feeding more than the average amounts of corn per head showed greater losses than the others. In this case, the loss was almost equal to the value of the added corn ration. More protein supplements would probably have changed this relationship decidedly. The farms feeding roughages heavily suffered greater than average losses but equal to about a quarter of the value of the added roughage. This was probably caused by a wasteful use of roughage as well as other feeds on a few of the farms.

It is safe to say that these farmers stand to profit by more careful feeding and the increased use of roughages—particularly of higher grade roughages. It seems that more protein supplement and not less corn is needed in the grain ration. In the use of labor and buildings care and efficiency and not added expense are wanted. All of these should be combined with a careful selection of cattle in order to obtain a higher production of butterfat and calves.

### Feeding Steers

Steers were fed on about one-fifth of the cost route farms, the most common size of lot being about two carloads. In all, complete records were obtained on 11 feeding enterprises. This number, because of the wide variety of practices, is too small to serve as a basis for any sweeping conclusions. Consequently, only the averages of the more significant figures from the records, and a more complete summary of three selected cases are given in table XIII.

This table shows that the steers fed on these farms averaged over 800 pounds when put on feed and were kept on the farm nearly eight months, gaining 1.4 pounds per day, or 328 pounds in all. Eight of the eleven lots of cattle were bought in the fall, and seven of these were run in the stalk fields.

The largest element of cost per hundred pounds of gain was 10.7 bushels of corn plus the equivalent of about 3.2 bushels contained in silage. In addition to the corn, silage, hay and pasturage 60 pounds of linseed oilmeal or cottonseed meal were fed. Feed represents about 80 percent of the total cost.

The most common type of feeding enterprise is exemplified by lot 1 in table XV. These cattle were bought in the fall and turned into the stalk fields for a couple of months after which

TABLE XIII. FEEDING STEERS

Farm number	Average of 11 cases	Lot 1	Lot 2	Lot 3
Index of cost per lb. gain.....	.173	.174	.129	.161
Value feed per lb. gain.....	.142	.150	.110	.128
Number of head.....	44	46	34	40
Date of purchase.....		Nov.	Mar.	Oct.
Date of sale.....		April	Dec.	21 in June, 19 in Nov.
Initial weight.....	838	858	749	873
Sales weight.....	1,161	1,117	1,104	1,328
Days on farm.....	236	159	275	316
Days on grain feed.....	168	169	72	116
Daily gain, lbs.....	1.39	1.66	1.29	1.47
Used per cwt. gain:				
Hours of man labor.....	3.6	4.5	1.7	3.1
Hours of horse labor.....	.9	.5	1.4	.7
Bushels corn.....	10.7	14.4	6.5	6.5
Pounds linseed oilmeal and cottonseed meal.....	60	124	18	68
Total pounds concentrates.....	685	630	374	754
Tons silage.....	.6	1.2		.8
Purchase price.....	\$ 8.14	\$ 9.00	\$ 8.25	\$ 7.29
Sales price.....	\$ 10.12	\$ 9.90	\$ 8.19	\$ 8.38

they were put in the dry lot and finished out in the early spring. On these cattle grain consumption and labor requirements are higher than on the lots which are kept on pasture for some time. This method is adapted to farms producing a surplus of corn over the requirements of the hogs and with labor available in the winter. It fits in nicely where the cropping system requires all available labor in the growing season and where there is no surplus of land for pasture.

The second type of feeding enterprise represents the production of beef on pasture and is adapted to farms with areas of rough land which cannot be cropped conveniently. These cattle were bought in April and pastured thru the summer, thus requiring less labor and only about half as much corn per hundred pounds of gain as the first lot. Under favorable conditions gain is obtained at a lower cost. However, the rate of gain was only about 1.3 pounds per day as compared to 1.66 for the first lot. Consequently, this method is likely to prove most profitable on those farms where the pasture land cannot well be used to grow corn or some other crop more profitable than grass. This system has this disadvantage: The feeders are bought in the spring when they are highest and the fattened cattle are sold in the late fall in competition with the range cattle. More profit might have been made on "pasture-fattened" cattle if they had been kept on the farm a month longer and given a higher degree of finish.

The third type of cattle feeding represents a combination

and modification of the two others. Cattle for this type of feeding were bought in the fall like the first lot and were run on the stalks for a couple of months. Then a part of the cattle were put in the dry lot and fattened out in the late spring thus using a surplus of corn on the farm.

The rest of the steers were turned out on pasture in the spring in order to make use of the surplus pasture available. They were then finished and sold in the fall. This represents an attempt to make use of some rough pasture land on a farm which is mostly tillable and produces more corn than can conveniently be fed to the other livestock kept. Under these conditions full use was made of the corn stalks, other rough-age pasture land and labor in the winter.

It will be noticed that each of the feeding systems described has a definite place in the farm organization, but each under a definite set of conditions. Either one would be out of place under the conditions adapted to the other.

### Poultry

Flocks of poultry were kept on nearly all the farms on the cost route. These flocks averaged about 150 hens but varied from 15 or 20 to 500. The average expenses were slightly more than the income in 1925, and decidedly more in 1927 when the prices of poultry products were low. In 1926 the average income exceeded the expense by a small amount. Of the total expense of \$477 on the average flock, about half represented the value of feed used by the poultry. The most important element of feed was corn of which about 120 bushels were used per farm. The next most important farm feeds were oats, of which about 100 bushels were used, and skim milk, of which the poultry used 500 to 600 gallons. The poultry enterprise used between one and a half and two months of labor.

The total feed consumption amounted to an average of 88 pounds per hen and the labor to 2.8 hours per hen. There was, however, a wide variation. On a few farms the poultry received but little feed; on others they were fed heavily. The income per hen also varied widely but averaged about \$3.00. The egg production per hen varied from 26 to 153 eggs. On two-thirds of the farms it was between 40 and 100. Practically half the flocks produced less than 70 eggs per hen, resulting in losses on most of these enterprises. It goes without saying that poultry culling would be a very cheap and profitable way to increase both the production and the income from poultry.

Table XV shows little difference between the different sized flocks except for the use of labor and the charge for shelter. Fifty percent less time was required per hen in caring for the poultry in large flocks than in small ones. As between the

TABLE XIV. POULTRY—INCOME AND EXPENSES  
Averages by Years, 1926-1927

	1926	1926	1927	3-year average
Number of farms.....	31	20	16	182
Number laying hens.....	156	143	158	80.2
Eggs per hen.....	76.3	90	72.3	
Expenses:				
Feed.....	\$ 213.85	\$ 196.44	\$ 215.16	\$ 307.81
Labor.....	106.37	117.80	156.16	124.36
Buildings, land and equipment.....	31.94	34.23	40.39	35.18
Total expenses*.....	\$ 449.74	\$ 463.71	\$ 528.87	\$ 476.46
Income:				
Eggs sold and used.....	\$ 282.51	\$ 296.68	\$ 258.12	\$ 290.92
Poultry.....	141.70	180.23	158.90	162.12
Total income*.....	\$ 424.21	\$ 476.91	\$ 417.02	\$ 454.25
Physical costs:				
Corn, bu.....	79.8	121.9	175.2	121.8
Oats, bu.....	113.3	87.9	90.3	99.6
Skim milk, gals.....	465	517	601	517
Other feed, lbs.....	2,832	2,002	3,011	2,823
Feed per hen, lbs.....	72	91	100	89.1
Labor per hen, hours.....	3.4	3.	3.3	2.6
Income per hen.....	\$ 2.80	\$ 3.40	\$ 2.72	\$ 3.03

\*Including miscellaneous items in addition to those given in detail.

smallest flocks averaging 66 hens, and the largest, which averaged 234, it required 1.9 hours per hen more time in the large flocks. The total charge for shelter for the large flocks was only slightly greater than for the smallest.

The production per hen in the two groups of smaller flocks averaged about 70 eggs. In the larger flocks more care was given to the selection of the hens and the production amounted to 86 eggs per hen. This together with the saving of about a dollar per hen in the total expenses made the difference between a small loss on the enterprise and a moderate profit.

TABLE XV. POULTRY—SIZE OF FLOCKS AND INCOME OR EXPENSE

Size of flock	Under 100 hens	100-199 hens	200-299 hens
Number of farms.....	24	20	10
Average number of hens.....	66	145	234
Eggs per hen.....	71.5	70.2	86.6
Total expenses.....	\$ 261.97	\$ 449.42	\$ 674.51
Total income.....	\$ 227.80	\$ 424.76	\$ 720.74
Physical costs:			
Feed per hen, lbs.....	91.4	81.6	93.6
Labor per hen, hrs.....	4.1	3.0	2.2
Income per hen.....	\$ 3.45	\$ 2.86	\$ 3.12
Expense per hen.....	\$ 3.97	\$ 3.04	\$ 2.60

The performance of the majority of these farms was very low. On 451 farms on which records were obtained by the Extension Service in 1928, an average of 91 eggs and a total income of \$3.16 were obtained per hen. This should be surpassed where the flocks are given better care. On 142 Iowa poultry record flocks in 1928 the egg production averaged 138 eggs, and the income \$6.44 per hen.

If these farmers wish to sell poultry products, they should give their flocks more attention, provide adequate housing and improve the rations. The figures in table XIV suggest that less corn should be fed, but much more milk and mash. Otherwise it would be better to cut down the flock to the number needed to supply the requirements of the family.

### Combinations of Livestock Enterprises

In organizing the farm, the object is not merely to plan a profitable hog or cattle enterprise, but to plan such a combination of these enterprises as will make the most profitable use of feed crops, keep labor employed profitably the year around, and conserve soil fertility.

On the typical 160-acre farm on the east route about 50 acres were in corn, 24 acres in oats and barley, 7 in hay and 9 in timothy seed. To make use of the feeds produced, from 6 to 20 sows were bred, and an average of 6 milk cows were kept together with 9 animal units of other cattle.

But this gives a less distinct notion of the livestock systems than would a description of the enterprises on a few typical farms. Thus, on one farm of 160 acres with a considerable area of rough land, eight sows were kept and about 14,000 pounds of pork were produced in the course of the year. In addition to this there was a small stock cattle enterprise consisting of three milk cows and about five animal units of other cattle. The principal livestock enterprise consisted of two carloads of feeder cattle bought to pasture on the rough land and consume the greater part of the corn raised.

Other farmers might have solved the same problems by keeping a dairy of 10 or 12 cows to make use of the rougher parts of the pasture land, and by plowing up the rest of the farm and putting it in corn to support a larger hog enterprise.

On a second farm of 180 acres, with more smooth land, 60 acres were in corn and only 20 in pasture. Part of the corn was fed to the pigs raised from 20 sows. The rest of it went to three carloads of steers. This made a more intensive system and was well adapted to the crop system which produced large amounts of feed and needed the large amounts of manure.

A third farm had 280 acres of which about 100 acres was rough and best kept in pasture. The rest was good crop land.



The man on this place kept 75 acres in corn and about 40 in small grains. In order to consume the greater part of the feed produced, 25 sows were bred and about 45,000 pounds of pork were produced, including spring and fall pigs. The pasture land here was used by a herd of 27 stock cows and their calves which were raised to 800 to 900 pounds.

Each of these men had a somewhat different problem. Each tried to select a combination of enterprises which would make the best use of the crops raised and the pasture land available. In some cases feeders or stock cattle were used where other farmers might have chosen dairy cattle. In others, some of the cattle were displaced by sheep. Stock cattle were kept to use pasture land and hogs or feeder cattle to consume the corn. The proportionate size of these enterprises depended on the amount of pasture and the labor available in the different seasons of the year. A fuller discussion of the organization of these farms will occur in a subsequent bulletin which will deal with the re-organization of Iowa County farms. This will deal with combinations of the crop system, the livestock system and the labor and power needed.

In addition to the basic factors just mentioned, it is also necessary to adjust the livestock system to the price situation. To be most successful, all possible consideration should be given to the price adjustments under way. That is, in so far as possible the livestock system should be planned to meet the price situation which promises at market time.

However, the possibilities of adjustment of the breeding operations far enough in advance to be of benefit are limited. Prices of livestock and feeds change rapidly, while cattle and even hog production are relatively long time businesses. When it is reasonably clear that the country is becoming overstocked with beef cattle, or when farmers indicate they intend to breed decidedly fewer sows for the next spring's pig crop, the wise farmer will take his cue.

An adjustment of equal importance has to be made within the feeding season. If corn is high relative to the price of hogs, but in line with that of beef, it is possible, even after the stock has been put on feed, to divert a considerable amount of the feed from the one enterprise to the other. A 10 percent change in the weight at which it is planned to sell hogs or steers does not involve any great difficulty if the plans are changed a couple of months before the stock is sold. That is, hogs may be sold at 200 pounds instead of 220, and a gain of 330 pounds may be put on the steers instead of 300. This involves a current modification of the plans rather than a sweeping change in the basic organization.