SEASONAL VARIATION OF MICHIGAN FARM PRICES

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This is to certify that the

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SEASONAL VARIATION OF MICHIGAN FARM PRICES

By

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The author, of course, assumes full responsibility for any errors that may be present in this manuscript.

LAWRENCE LEROY BOGER

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INTRODUCTION

Purpose and Utility of Study. The production of farm products is seasonal, but consumers desire a supply the year around. Consequently, someone must store these products to meet the consumers' needs. Some products can be stored easily and inexpensively, while others which are highly perishable are more difficult and costly to store. Generally speaking, prices of commodities vary throughout the year by the cost of storing from one production season to the next.

The seasonality of production and marketing in the United States or the world as a whole often has more influence on the Michigan farm prices than does Michigan production and marketing. Hence, geographic or climatic conditions in Michigan may make it possible for Michigan farmers to market their produce during the time of high seasonal prices.

Price movements during World War II were influenced by artificial controls. These controls altered the amount of seasonal variation by setting ceilings or floors on prices. Since controls have been relaxed, seasonal price movements are again approximating their pre-war pattern.

It is hoped that farmers, food processors, marketing agencies, and others who buy, sell, or handle the major farm products produced in Michigan can acquaint themselves with these patterns and plan their marketing programs accordingly. It is not always advisable to produce farm products for the highest prices, since the gain in price may be more than offset by higher costs.

Several factors, such as weather conditions, business activity, and the trend of farm prices, alter the seasonal price movement in any year. In some commodities the variation in patterns from one year to the next is quite pronounced, while others are approximately the same year after year. The average adjusted seasonal pattern should be applied in individual years only after adjustments for current as well as possible future variations in economic conditions are made.

Source and Scope of Data. The Michigan farm prices used in this study were those reported to the office of the State Agricultural Statistician, Lansing, Michigan. Monthly marketings were computed from data in the same office. Prices from 1910 to 1925 were taken from Statistical Bulletin 15, "Prices of Farm Products Received by Producers, the North Central States", prepared by the Bureau of Agricultural Economics of the United States Department of Agriculture. Cattle prices at Chicago were published by the Production and Marketing Administration of the United States Department of Agriculture. Production data concerning the size of the United States crop by years were taken from various issues of Agricultural Statistics published annually by the United States Department of Agriculture. Data on the prices received by farmers in the United States were taken from "Agricultural Outlook Charts, 1947", prepared by the Bureau of Agricultural Economics of the United States Department of Agriculture.

The above sources of data were used to compute the average seasonal variation in prices for the 10 pre-control years

preceding World War II, and to compare the average seasonal patterns of farm product prices during early and recent periods, years of large and small crops, and years of rising or falling farm prices.

Method of Procedure. Monthly prices from 1910 to 1942 were adjusted for price cycles, price trends, and other price movements.[1/] These adjusted prices were used to compute the index of average seasonal variation for the periods 1910-1919 and 1933-1942, and for years of large crops and small crops. The actual prices received by Michigan farmers were used in the computation of an unadjusted index of average seasonal variation during periods of rising or falling farm prices.

Appropriate years were selected from the 20-year period, 1923 to 1942, to show the effect of a large or a small United States crop and also the effect of rising or falling farm prices on the average seasonal price pattern in Michigan. Total production and prices received by farmers in the United States were used to determine the exact years that fell into each classification.

In order to give a measure of the variation in the price from the average seasonal pattern, the index of irregularity was calculated for the years 1933 to 1942.

Definition of Terms. (a) Index of Irregularity: This is a measure of the amount of variation in the price for a given month from the average price prevailing in that month

1/ A more detailed explanation of the statistical methods used is included in Appendix A.

for the ten years, 1933 to 1942. Its value, added to and subtracted from the index of the average price in a given month gives an indication of the range of prices that prevailed in that month for approximately seven out of ten years. This is known as the zone of irregularity, and its value is twice as great as the index of irregularity. Thus, if an average monthly price was 110 percent of an average annual price, and the index of irregularity was 5 percent, it would mean that the price in that month varied between an index of 105 and 115 in approximately two-thirds of the years. The width of the zone of irregularity would be 10 percent. The smaller the value of the index of irregularity, the greater is the conformity to the average seasonal pattern. When its value is large, monthly prices in individual years varied considerably from the average monthly price.

(b) Large Crop: A large crop was one that was 10 percent or more above the average for the twenty years, 1923 to 1942, in the United States.

(c) Average Crop: An average crop was one that was less than 10 percent above or below the average for the twenty years, 1923 to 1942, in the United States.

(d) Small Crop: A small crop was one that was 10 percent or more below the average for the twenty years, 1923 to 1942, in the United States.

(e) Rising Prices: When all farm prices in the United States rose 10 percent or more in any year, they were deemed

to be rising. On the basis of this classification, farm prices rose an average of 20.0 percent in six years of the twenty.

(f) Stable Prices: When all farm prices in the United States rose or fell less than 10 percent in any year, they were deemed to be stable. On the basis of this classification, nine years of the twenty were years of stable prices and the net movement was 2.0 percent upward.

(g) Falling Prices: When all farm prices in the United States fell 10 percent or more in any year they were deemed to be falling. On the basis of this classification, farm prices fell an average of 23.2 percent in five years of the twenty.

(h) Monthly Marketings: These figures represent the average percent of the annual production that was moved to market by Michigan farmers in any month. The percent produced monthly was used for the more perishable products, such as eggs and milk. The average percent of creamery butter manufactured monthly was used as an indication of farm butter marketings. For corn, average monthly purchases by elevators were used as a guide, since actual monthly marketings by farmers were unavailable.

PART I

MAJOR CROPS

Most of the major crops are harvested and ready for market within a relatively short period of time. With the exception of potatoes and apples, these crops can be stored easily for a year or more. Fresh apples and potatoes, because of their more perishable nature, must be moved into consumption within a year since the quality deteriorates rapidly after a few months in storage. On the average, most of the major crops are marketed within a few months following harvest.

Normally, prices are lowest following the harvest season and rise steadily throughout the year. This rise corresponds to about what it costs to store these commodities from one harvest to the next. In particular years, prices may rise more than normal, so that it becomes profitable to store. For instance, when all farm prices are rising, the prices of the major crops rise more than normal. On the other hand, if all farm prices are falling, the prices of the major crops usually rise less than normal or may even fall during the year so that it becomes unprofitable to store. Storage costs tend to be fixed and do not fluctuate so widely as prices. The average seasonal pattern for the major crops was not, and probably will not be, repeated regularly in individual years. The decision as to whether or not to store in any year depends upon the market price at the time of harvest and the

expected market price that will be determined by future economic conditions.

For the staple crops, the cost of storage in any year may be small if storage facilities are adequate and available. However, if storage facilities are not readily available and temporary storage, or public warehouse, facilities must be used, the costs involved may not be offset by a seasonal rise in price. Michigan is a feed deficit producing area. Thus, Michigan farmers usually buy more grain than they sell. Seasonal price variations are important to those farmers who must buy grain to fulfill their annual needs. They should buy grain early in those years when the seasonal rise is expected to be greater than normal and buy as needed in those years when the price is expected to rise less than enough to cover storage costs. The average seasonal variation in the prices of the major crops grown in Michigan for selected periods from 1910 to 1942 are reviewed below.

CORN

Seasonal Pattern. Corn prices have followed a rather regular seasonal pattern, rising from a low in March to a high in September (Figure 1 and Table I). The price rise was about 18 percent or about 12 cents per bushel for the period 1933-1942. The greatest variation in prices from the usual seasonal pattern occured during the summer and early winter months. The average price rise throughout the year represented about what it cost to store corn. Even though there

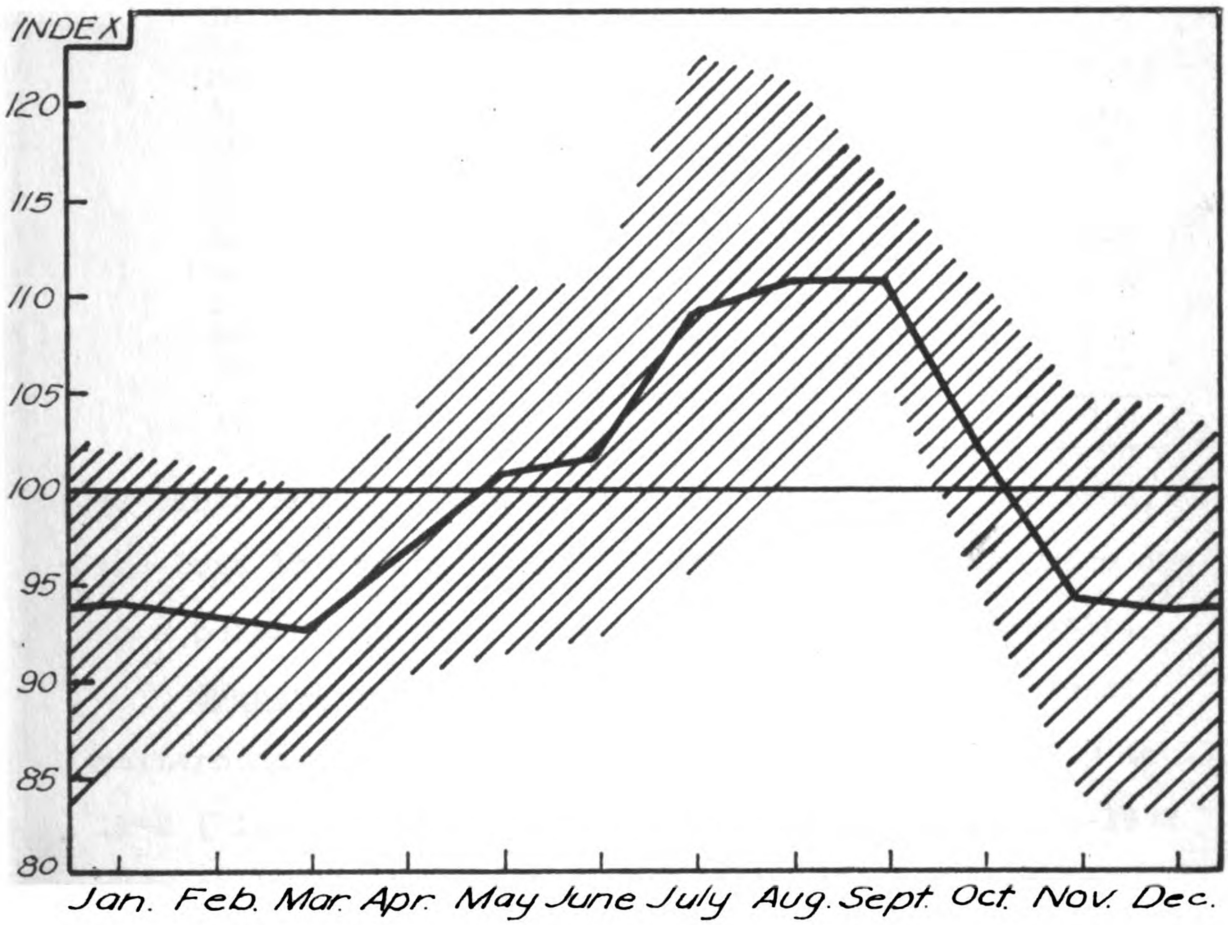

Figure 1. CORN: Index of Average Seasonal Variation of Michigan Farm Prices and Zone of Irregularity, 1933-1942.

Table I - CORN: Average Seasonal Variation of Michigan Farm Prices and Index of Irregularity, 1933-1942.

Month	Average Seasonal Variation of Prices: Index	Price per bushel	Index of Irregularity
	(percent)	(dollars)	(percent)
January	94.1	.63	8.3
February	93.4	.63	7.7
March	92.7	.62	7.2
April	96.8	.65	6.8
May	100.8	.68	9.7
June	101.6	.68	9.6
July	109.2	.73	13.5
August	110.7	.74	9.8
September	110.9	.74	5.5
October	101.9	.68	8.8
November	94.2	.63	10.9
December	93.7	.63	11.1
Average	100.0	.67	9.0

is considerable shrinkage involved when corn is stored, the loss in weight is usually offset by a higher price due to a better grade when corn is sold on a graded basis.[2/]

Comparison 1910-1919 and 1933-1942. The seasonal pattern has changed little from the period 1910-1919 to 1933-1942 (Figure 2). The seasonal movement during 1933-1942 rose to a somewhat higher peak in the late summer and early fall months, then fell a little more rapidly until the following March than it did in the period 1910-1919.

Size of Crop. The size of the corn crop was a factor influencing the degree of variation in the seasonal price (Figure 3). There was less seasonal variation when the corn crop was small than when the corn crop was large. The greater variation following the harvest of a large crop was

2/ L. J. Norton, University of Illinois Extension Circular 516 - "When Should Grain Be Marketed", July 1941. With interest at 6 percent for 8 months, shrinkage in weight of 12.1 percent, and insurance and taxes for 8 months, 72 cent corn in July is equivalent to 60 cent corn in November.

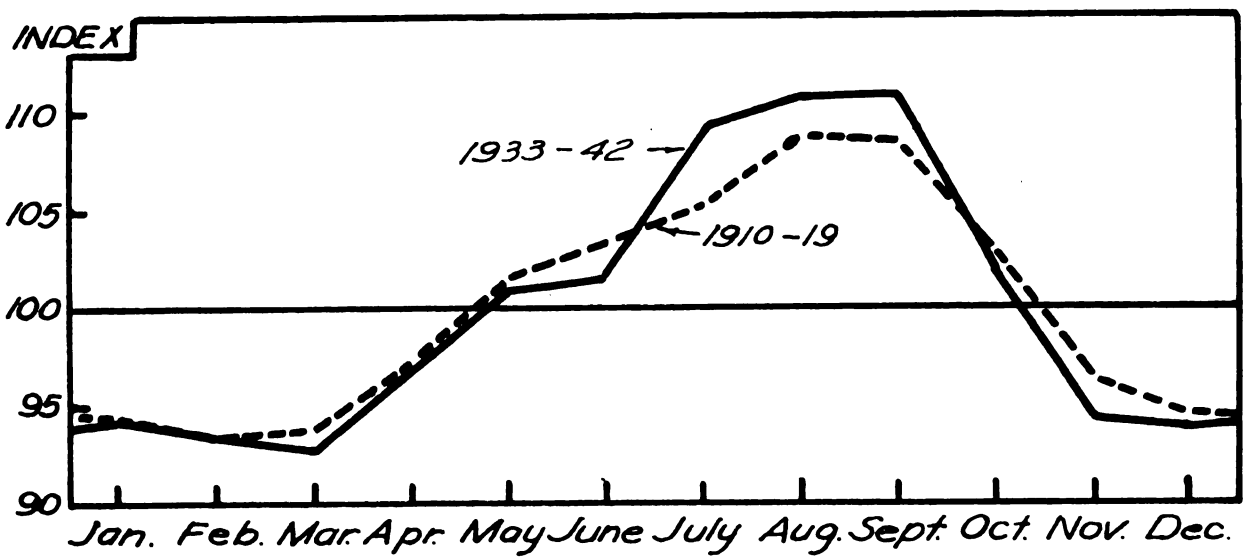

Figure 2. CORN: Indexes of Average Seasonal Variation of Michigan Farm Prices, 1910-1919 and 1933-1942.

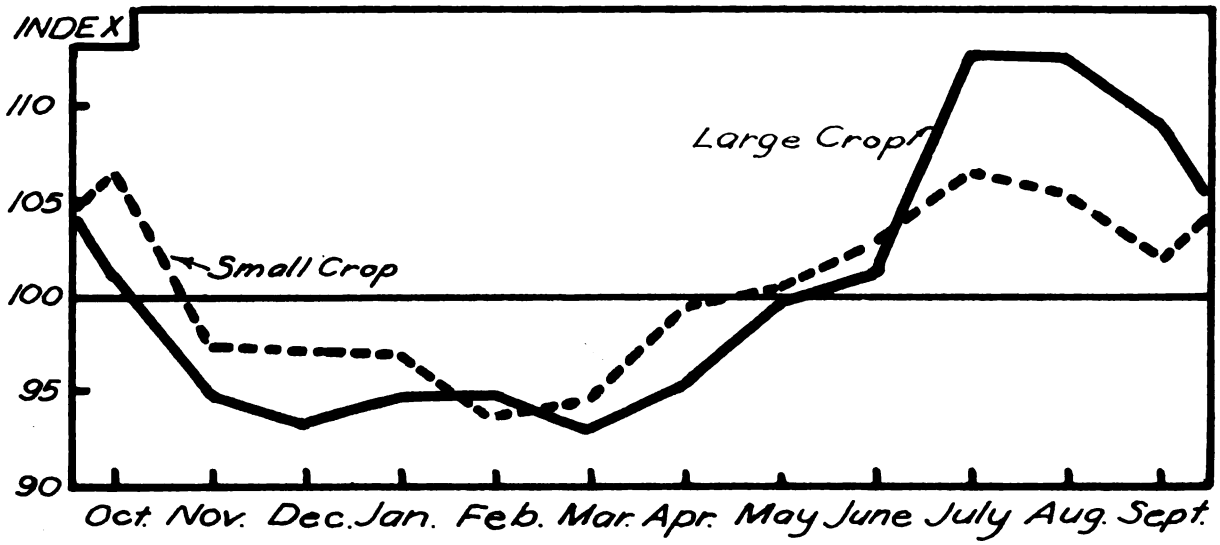

Figure 3. CORN: Indexes of Average Seasonal Variation of Michigan Farm Prices for Years Following the Harvest of Five Large Crops and Four Small Crops Selected From the Years 1923-1942.

mostly due to the greater drop in price in the fall and winter months. There was little change in the months of peak and low prices in years of large or small crops.

Summary and Conclusions. The average seasonal rise in corn prices was just about sufficient to cover storage costs even though a better grade could be expected. Seasonal prices were more variable in 1933-1942 than in 1910-1919. For Michigan farmers, it was more advantageous to store corn for a longer period in those years when production was high than in those years when production was low. In years of low production, farmers tend to market their livestock earlier, thus decreasing the demand for corn as feed later in the marketing season.

WINTER WHEAT

Seasonal Pattern. The average seasonal variation in the price of wheat was small and the variation between years was relatively great (Figure 4 and Table II). On the average, wheat prices were lowest in the month of August, and highest in the month of May. The variation between the high and low months was only about 9 percent, which represented 8 cents per bushel for the period 1933-1942. If wheat would have been stored the entire nine months, Michigan farmers would have realized about 1 cent per bushel per month which is somehwat less than the estimated cost of

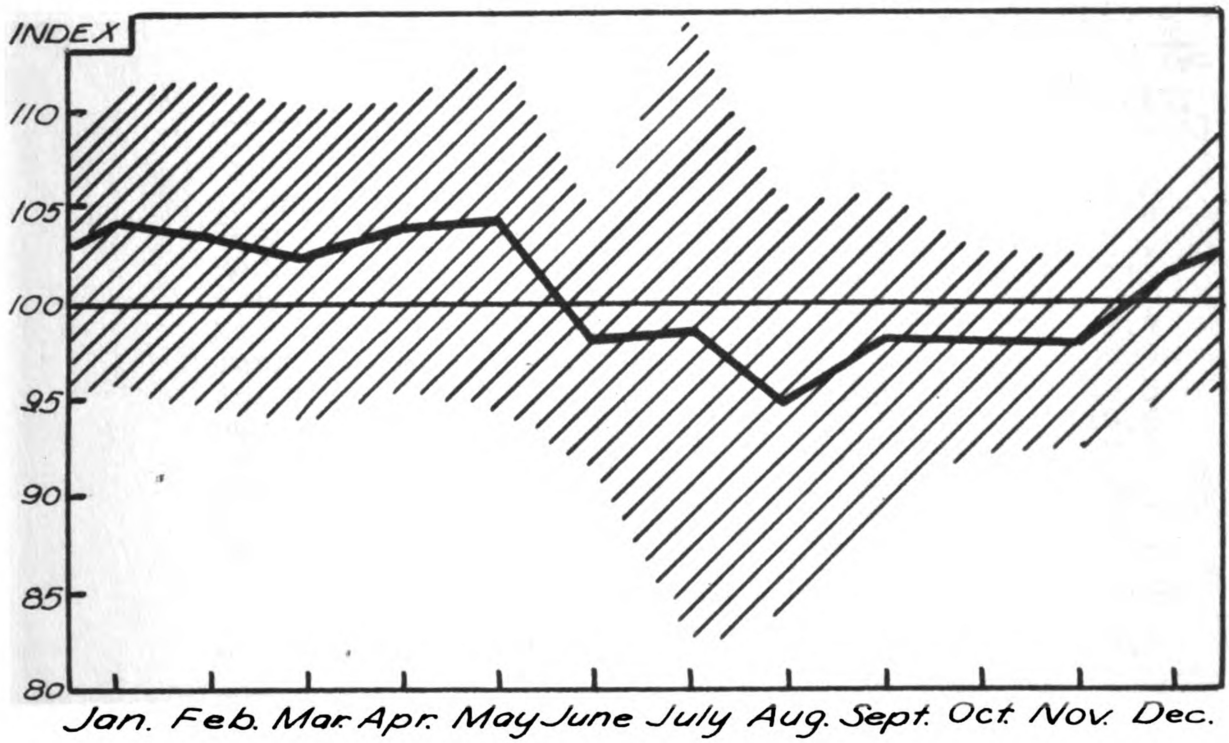

Figure 4. WINTER WHEAT: Index of Average Seasonal Variation of Michigan Farm Prices and Zone of Irregularity, 1933-1942.

storage.[3/] About three-fifths of the Michigan wheat crop was marketed during the low-price months of July, August, and September.

Table II - WHEAT: Average Seasonal Variation of Michigan Farm Prices and Index of Irregularity, 1933-1942.

Month	Average Seasonal Variation of Prices		
	Index	Price per bushel	Index of Irregularity
	(percent)	(dollars)	(percent)
January	103.6	.89	7.9
February	103.0	.89	8.8
March	102.0	.88	8.3
April	103.0	.89	7.7
May	103.6	.89	9.4
June	97.8	.84	6.9
July	98.4	.85	16.5
August	94.5	.81	10.5
September	97.7	.84	8.2
October	97.5	.84	5.1
November	97.5	.84	5.1
December	101.4	.87	6.5
Average	100.0	.86	8.4

Comparison 1910-1919 and 1933-1942. The seasonal price pattern of wheat changed somewhat between 1910-1919 and 1933-1942 (Figure 5). The seasonal price variations for wheat were 3 percent, or 7 cents a bushel, less in the

3/ L. J. Norton, University of Illinois, Extension Circular 516 - "When Should Grain Be Marketed", July 1942. The expenses for storing $1.00 wheat for six months were estimated as follows:

Interest for 6 months on $1.00 wheat at 6 percent	3 cents
Insurance for six months	1 cent
Storage space (where proper)	2.5 "
Binning expense	1 cent
Shrinkage and deterioration (2-5 percent)	2-5 "
Fumigation	.5"
Total	10-13 cents

Labor and storage space is not counted if they would have been unused otherwise. This reduces the cost of storage to 6-8 cents a bushel for $1.00 wheat for six months.

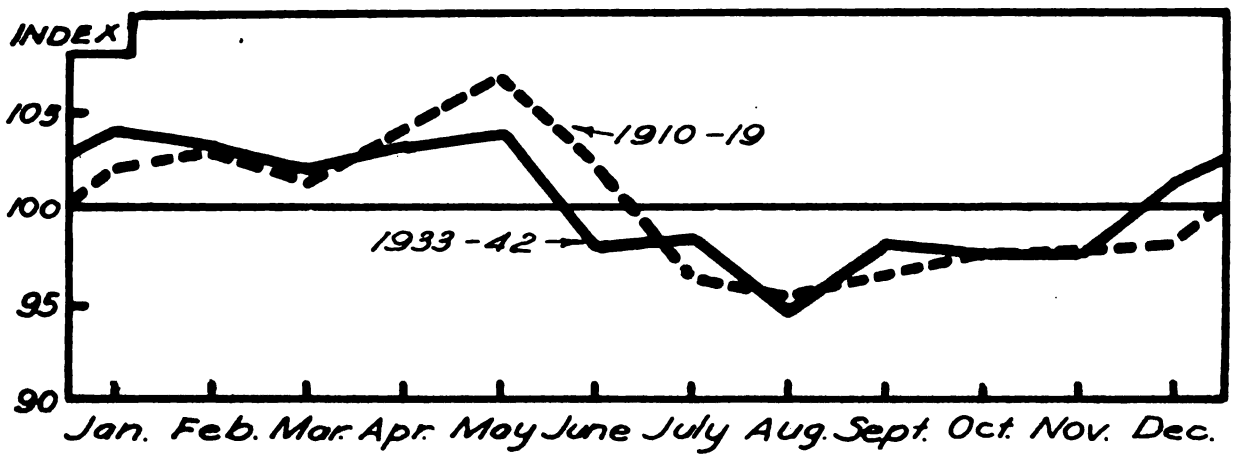

Figure 5. WINTER WHEAT: Indexes of Average Seasonal Variation of Michigan Farm Prices, 1910-1919 and 1933-1942.

1933-1942 period than earlier although the high and low months were the same. Prices in 1910-1919 rose more sharply immediately preceding the harvest season then slumped off more rapidly during the harvest season than did prices during 1933-1942.

Size of Crop. When wheat production was high the price dropped sharply following harvest to an index of 90 in August, then rose steadily until the following May to an index of 108 (Figure 6). This represents an average rise of almost 2 percent per month. On the other hand, when production was low, the price of wheat gradually declined following harvest until the early winter months, then rose slowly until February and declined again to a low point at the end of the marketing year in June. Here, a price advantage of only 1 percent per month would have been realized if the wheat would have been stored for 7 months.

Summary and Conclusions. Normally, it did not pay to store wheat since the advantage gained by a price rise during the year was more than offset by losses due to storage expenses, shrinkage, extra expense of binning, and the like. Wheat prices were relatively more favorable earlier in the marketing season in 1933-1942 than in 1910-1919. Following the harvest of a large wheat crop, it was more advantageous to store since prices dropped sharply at the beginning of the marketing season. The average monthly price rise following a large crop was about double the increase in price following the harvest of a small crop.

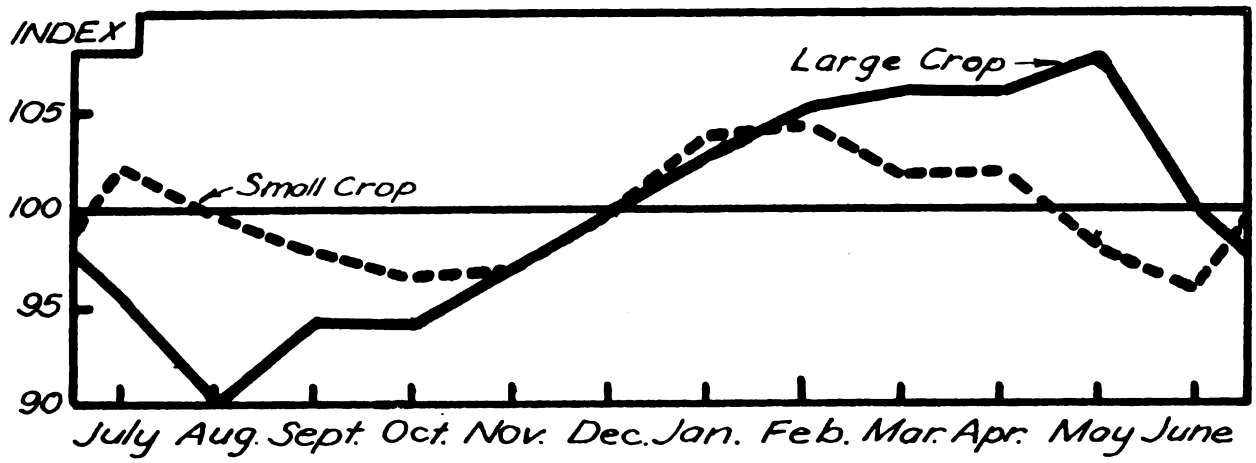

Figure 6. WINTER WHEAT: Indexes of Average Seasonal Variation of Michigan Farm Prices for Years Following the Harvest of Seven Large Crops and Five Small Crops Selected From the Years 1923-1942.

OATS

Seasonal Pattern. Michigan oats prices were lowest in August and highest in April (Figure 7 and Table III). The maximum variation was about 14.5 percent or 6 cents per bushel for the period 1933-1942. The seasonal price pattern was highly irregular, indicating that it was not repeated regularly in any given year. Oats prices conformed more closely to the average seasonal movement during the winter months than at any other time throughout the year.

Table III - OATS: Average Seasonal Variation of Michigan Farm Prices and Index of Irregularity, 1933-1942.

Month	Average Seasonal Variation of Prices		
	Index	Price per bushel	Index of Irregularity
	(percent)	(dollars)	(percent)
January	103.2	.39	8.4
February	104.2	.39	9.2
March	104.0	.39	10.5
April	105.7	.40	9.3
May	105.1	.39	8.7
June	101.2	.38	7.5
July	104.1	.39	16.2
August	91.2	.34	15.1
September	94.2	.35	13.5
October	92.8	.35	7.1
November	95.3	.36	7.0
December	99.0	.37	5.1
Average	100.0	.38	9.8

Michigan farmers marketed about one-third of their oats crop in the months of August and September. Marketings then levelled off and the price gradually advanced about three-fourths of a cent per bushel per month until the

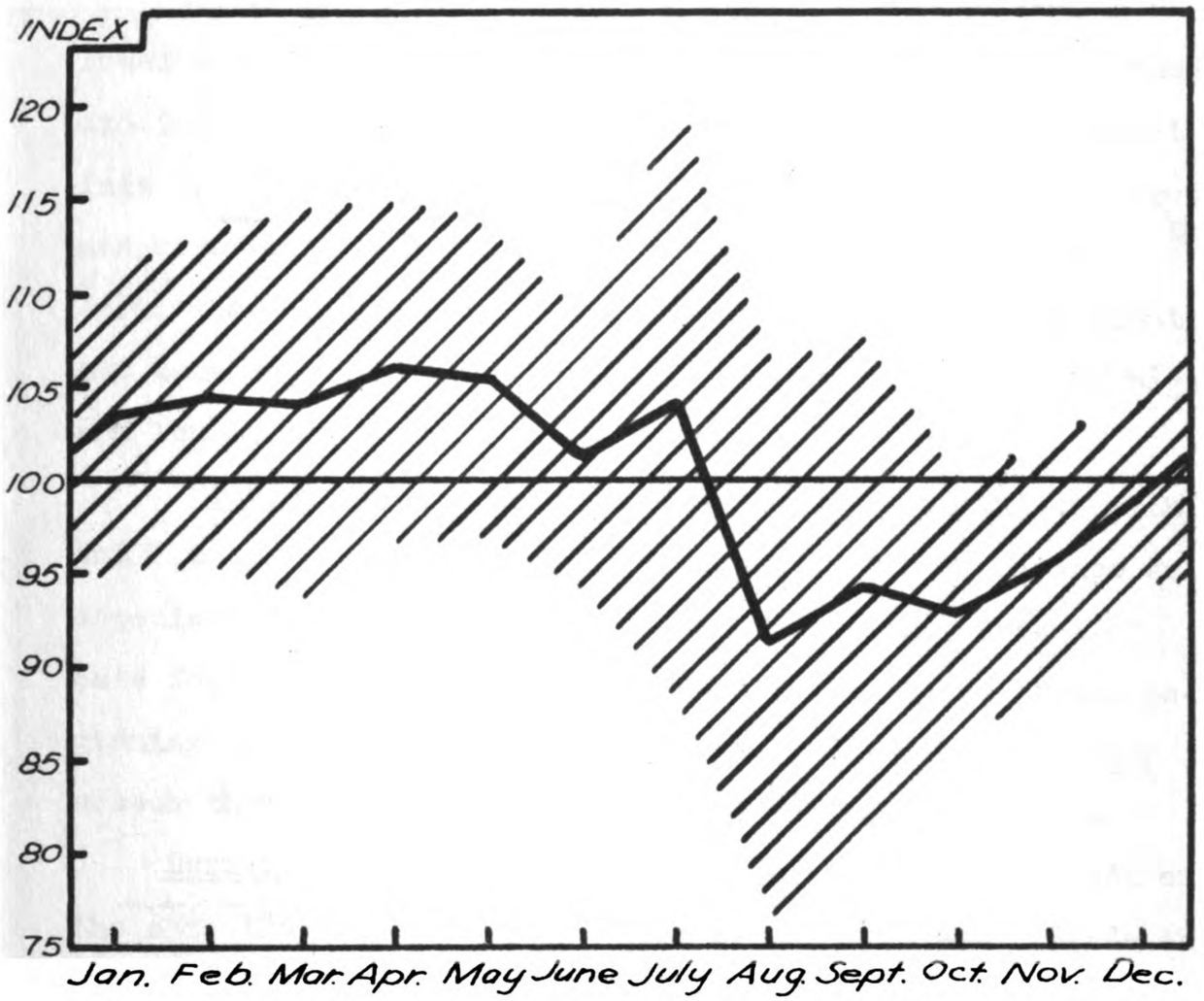

Figure 7. OATS: Index of Average Seasonal Variation of Michigan Farm Prices and Zone of Irregularity, 1933-1942.

next harvest season. It has been estimated that the cost of storing 30 cent oats for 8 months is about 4.6 cents per bushel or about the same as the average seasonal price rise. 4/

Comparison 1910-1919 and 1933-1942. Oats prices followed a more regular seasonal pattern in 1910-1919 than they did in 1933-1942 (Figure 8). In the months of heavy marketings the drop was sharper in 1933-1942, but prices recovered and were relatively higher from November to the following April than in 1910-1919. The amount of variation was about the same in either case--about 14.5 percent between the high and low months.

Size of Crop. There was less seasonal variation with small crops than large crops (Figure 9). The difference was especially great late in the marketing season. Prices of oats following small crops were relatively higher at the beginning and considerably lower at the end of the marketing season than prices following the harvest of large crops.

Summary and Conclusions. Michigan farmers used most of the oats they raised for feed and seed on the farm. Since the

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4/ L. J. Norton, University of Illinois, Extension Circular 516 - "When Should Grain Be Marketed", July 1941. The expenses for storing 30 cent oats for 8 months were allocated as follows:

Interest on 30 cent oats for 8 months at 6 percent	1.2 cents
Insurance on 30 cent oats for 8 months	.3 cents
Storage space	2.0 cents
Cost of binning	.5 cents
Shrinkage (2 percent)	.6 cents
Total	4.6 cents

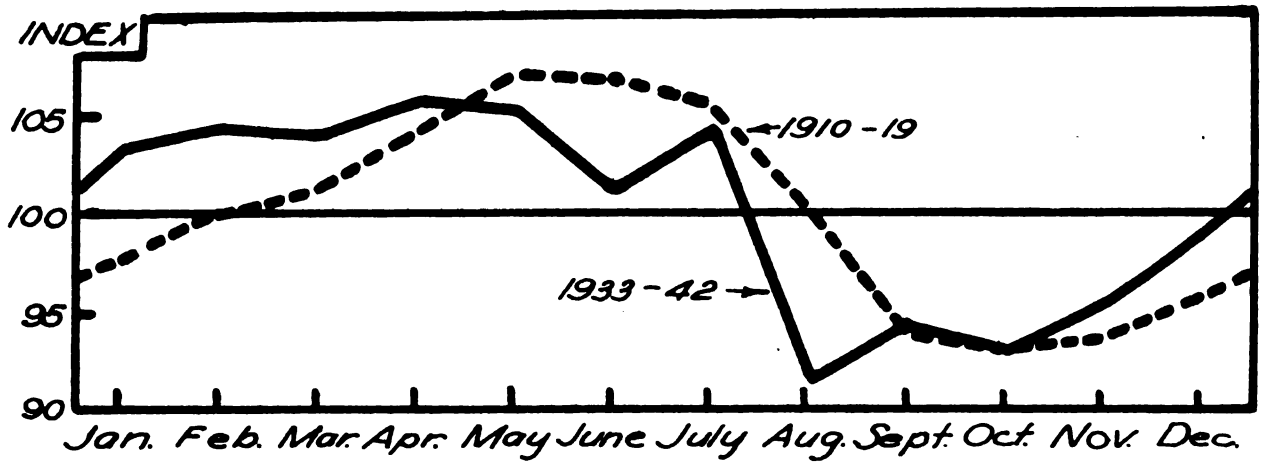


Figure 8. OATS: Indexes of Average Seasonal Variation of Michigan Farm Prices, 1910-1919 and 1933-1942.

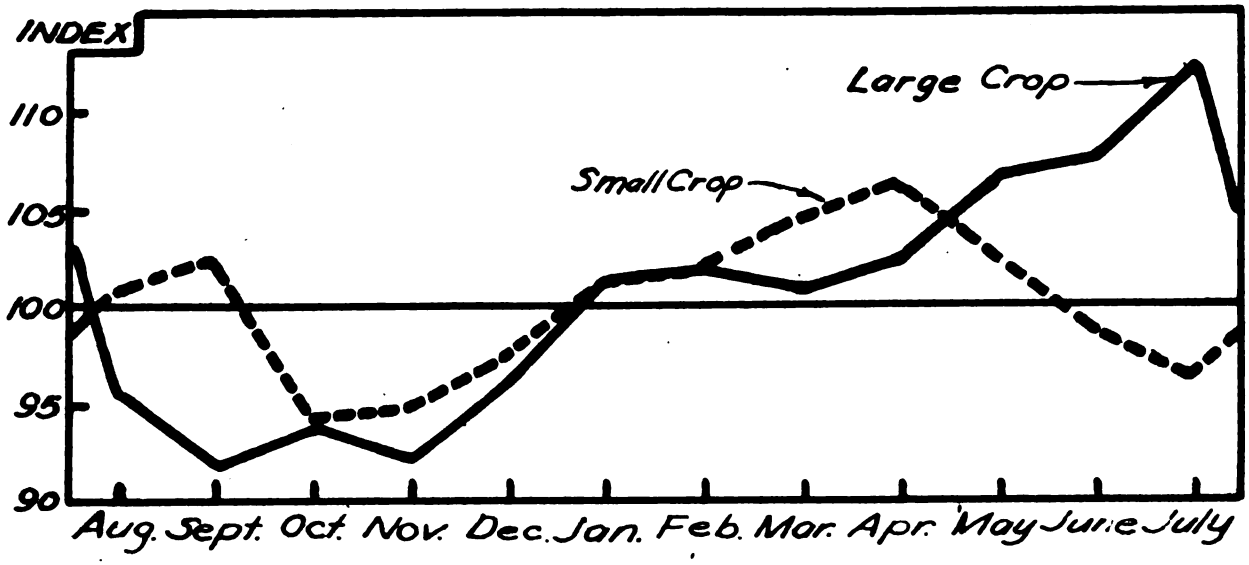


Figure 9. OATS: Indexes of Average Seasonal Variation of Michigan Farm Prices for Years Following the Harvest of Six Large Crops and Four Small Crops Selected from the Years 1923-1942.

amount they sold was only a small fraction of those raised and the price was highly irregular throughout the year, Michigan farmers were wise to sell the oats they had for sale immediately after harvest.

BARLEY

Seasonal Pattern. The average seasonal variation in the price of barley was small (Figure 10 and Table IV). From a low in August to a high the following February, the variation was only about 10 percent, or 6 cents a bushel. Like

Table IV - BARLEY: Average Seasonal Variation of Michigan Farm Prices and Index of Irregularity, 1933-1942.

Month	Average Seasonal Variation of Prices		
	Index	Price per bushel	Index of Irregularity
	(percent)	(dollars)	(percent)
January	100.7	.60	13.7
February	103.6	.62	7.4
March	103.1	.62	7.3
April	103.3	.62	9.3
May	103.1	.62	11.5
June	97.5	.58	7.0
July	94.9	.57	10.1
August	93.5	.56	15.4
September	99.5	.59	13.8
October	99.7	.60	9.0
November	99.8	.60	6.5
December	101.2	.60	6.7
Average	100.0	.60	9.8

most field crops, the prices during the period 1933-1942 were highly irregular indicating little conformity to the

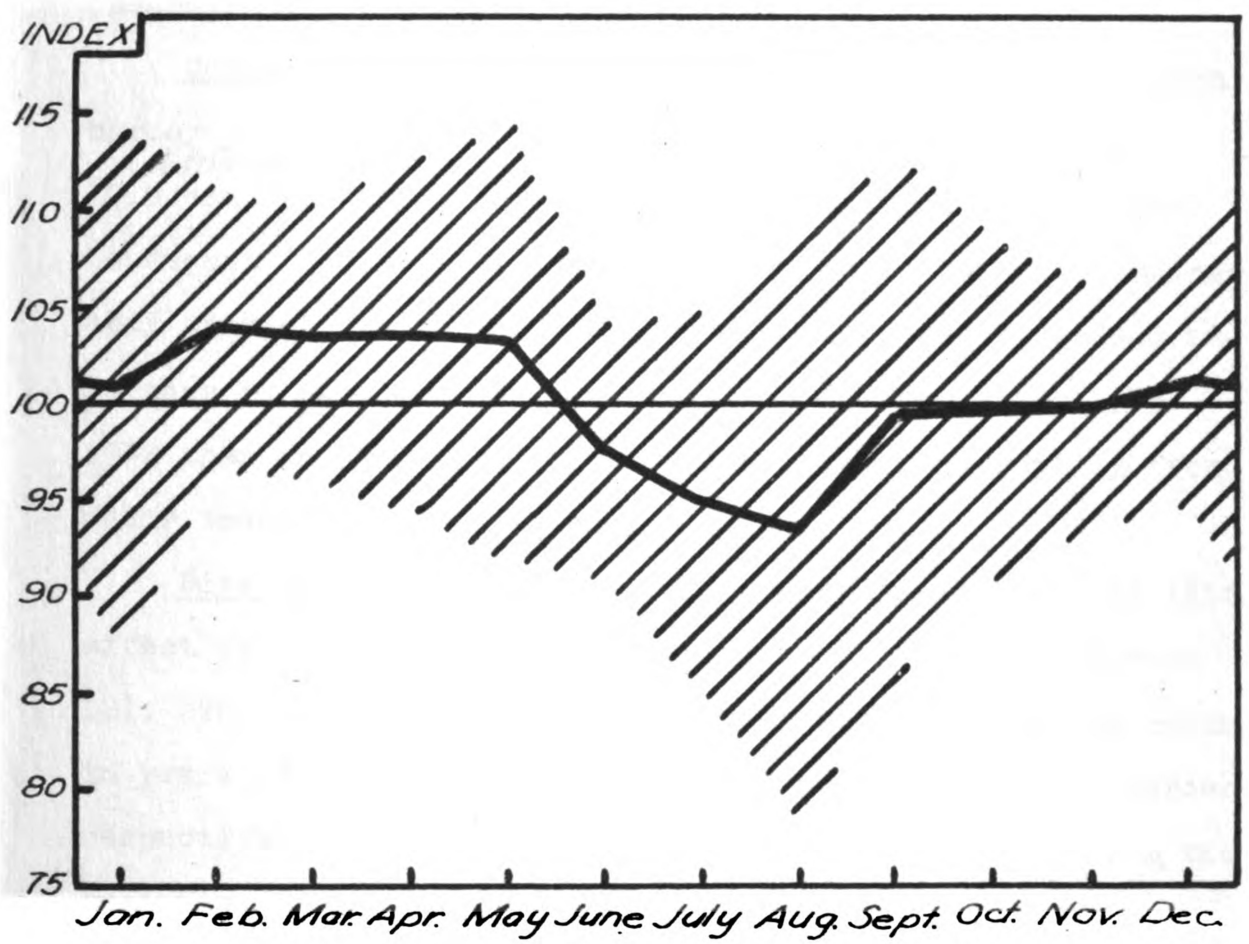


Figure 10. BARLEY: Index of Average Seasonal Variation of Michigan Farm Prices and Zone of Irregularity, 1933-1942.

average seasonal pattern. Almost four-fifths of Michigan's barley crop was marketed in August and September on the average, and very little was marketed late in the marketing year. The price rise from August to September represented one-half of the average annual increase.

Comparison 1910-1919 and 1933-1942. The month of high barley prices shifted from May to February between 1910-1919 and 1933-1942, and the low month changed from October to August (Figure 11). The amount of variation was considerably greater in the earlier period. There was a decided advantage in favor of earlier marketing in the decade 1933-1942 than in 1910-1919, since prices recovered rapidly from their seasonal low in August.

Size of Crop. The size of the crop apparently had little effect upon the seasonal movement of barley prices (Figure 12). The amount of variation between the high and low months in years of small crops and large crops was 10 and 11 percent respectively. In either case, prices rose steadily from the beginning of the marketing season for nine or ten months, then slumped off for two or three months toward the end of the season.

Summary and Conclusions. Most of Michigan's barley crop was used for feed, and about 20 percent was sold. The quality of the grain in some years makes it especially favorable for malting. Maltsters usually try to fulfill their annual needs as soon as possible following harvest. This normally

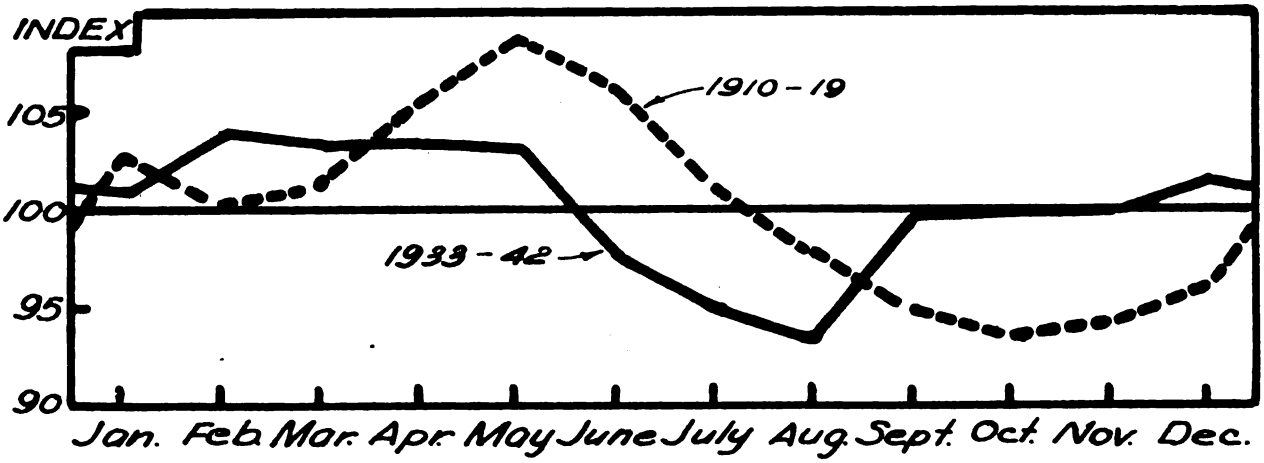


Figure 11. BARLEY: Indexes of Average Seasonal Variation of Michigan Farm Prices, 1910-1919 and 1933-1942.

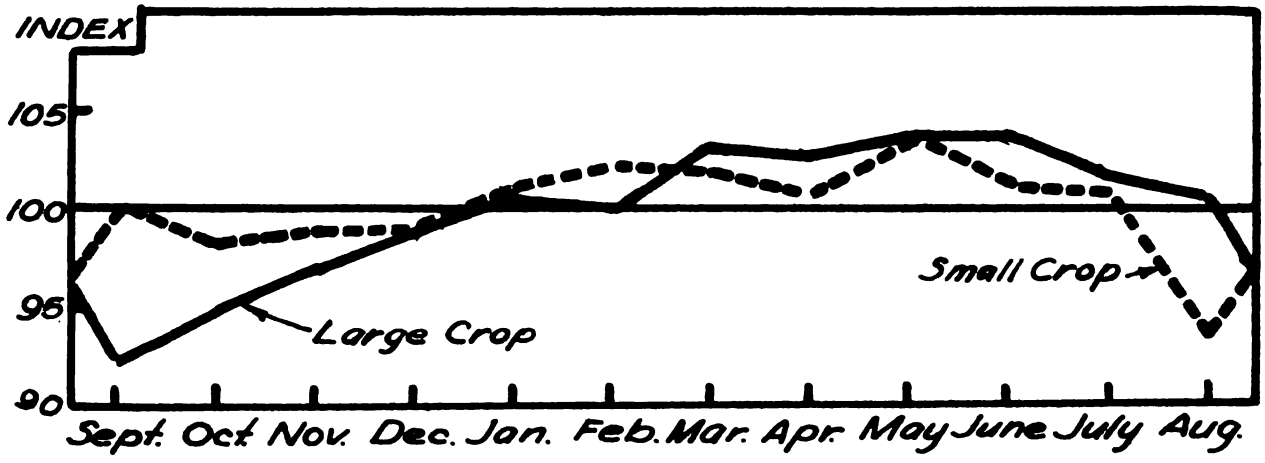


Figure 12. BARLEY: Indexes of Average Seasonal Variation of Michigan Farm Prices for Years Following the Harvest of Nine Large Crops and Eight Small Crops Selected From the Years 1923-1942.

maintains the price at a higher level soon after harvest in those years. Since the seasonal variation in price was no more than adequate to cover storage costs, there was little reason to store barley in the hope of a later price advantage. This was true regardless of the size of crop.

RYE

Seasonal Pattern. Rye prices from 1933 to 1942 averaged highest in January and lowest in June (Figure 13 and Table VI). Monthly marketings were highest during the months of July, August, and September. Prices rose from June to

Table V - RYE: Average Seasonal Variation of Michigan Farm Prices and Index of Irregularity, 1933-1942.

Month	Average Seasonal Variation of Prices		
	Index	Price per bushel	Index of Irregularity
	(percent)	(dollars)	(percent)
January	105.3	.61	7.2
February	103.0	.59	10.3
March	100.4	.58	10.2
April	99.1	.57	9.9
May	97.5	.56	9.6
June	91.3	.53	8.7
July	96.0	.56	19.5
August	97.8	.56	13.0
September	104.4	.60	13.2
October	102.4	.59	6.9
November	99.2	.57	4.3
December	101.6	.59	7.0
Average	100.0	.58	10.0

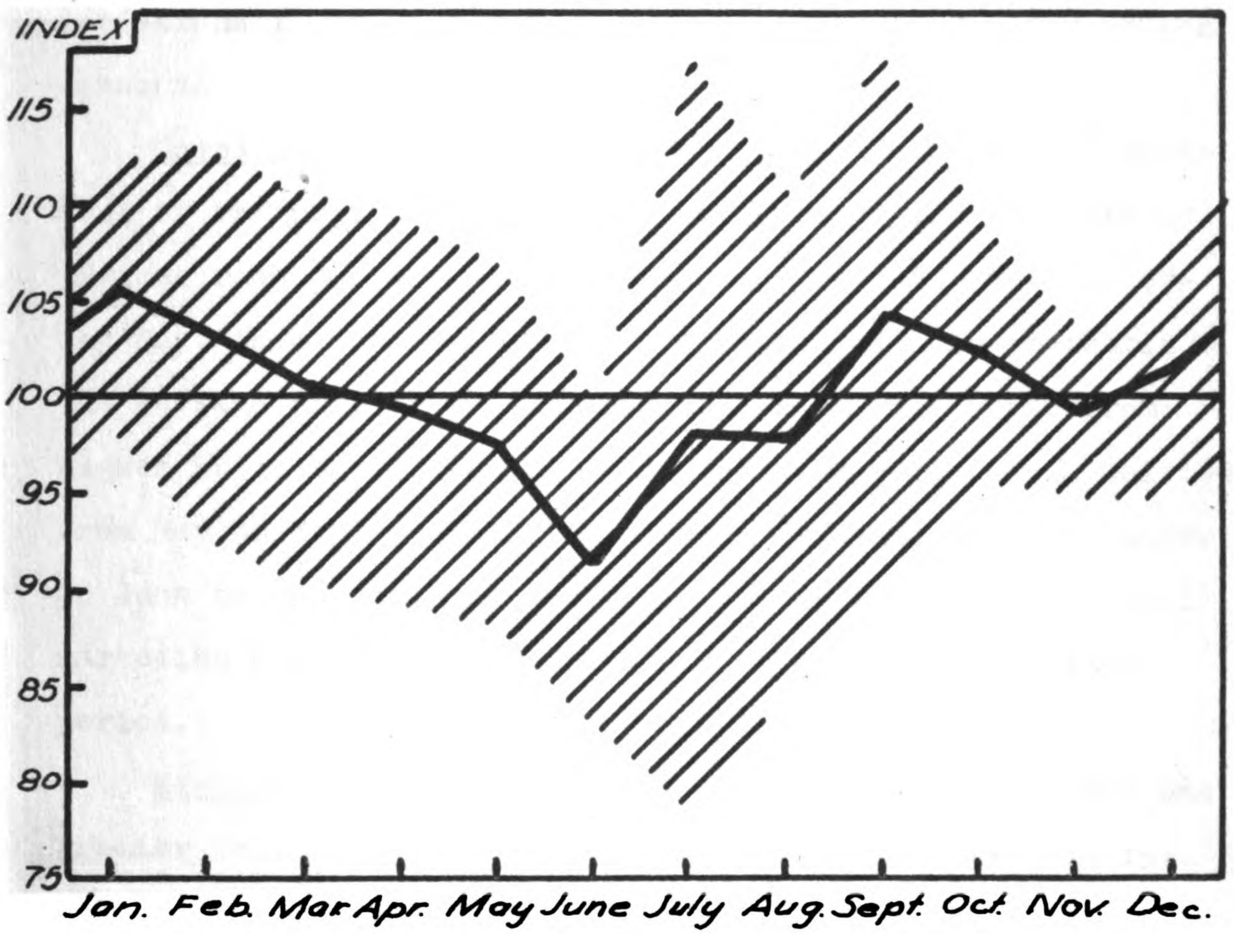


Figure 13. RYE: Index of Average Seasonal Variation of Michigan Farm Prices and Zone of Irregularity, 1933-1942.

September, fell off to November, rose again to January, then steadily fell again until June. The wide zone of irregularity indicates that the average seasonal variation was not regularly repeated in individual years. Because of this, variations in any year may be more important than the average seasonal variation pattern.

Comparison 1910-1919 and 1933-1942. The seasonal movement of rye prices in 1910-1919 was very regular (Figure 14). Prices rose following the harvest season until the following May, then declined during the months of heavy marketings. The average price rise was about 1 percent per month from August until the following May. The peak-price month shifted from May to September and the low-price month from September to June between the two periods. On the average early fall marketing was best for Michigan farmers during the later period.

Size of Crop. The seasonal variation of rye prices was greater following large crops than small crops (Figure 15). Following the harvest of a large crop, prices generally rose from August to February, then fell steadily until August. The average rise in price was about 2-1/2 percent per month, or slightly less than 2 cents per bushel per month. When a small crop was harvested, the price of rye remained near the average annual price throughout the year. The high-price month was August and the low-price month was the following June. The total variation was only 5 cents per bushel for the ten months.

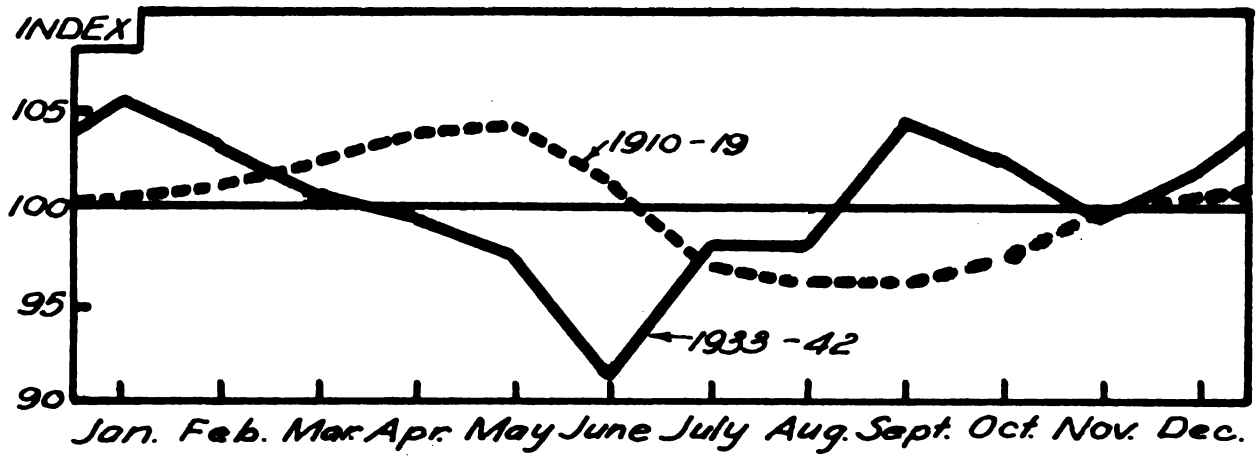


Figure 14. RYE: Indexes of Average Seasonal Variation of Michigan Farm Prices, 1910-1919 and 1933-1942.

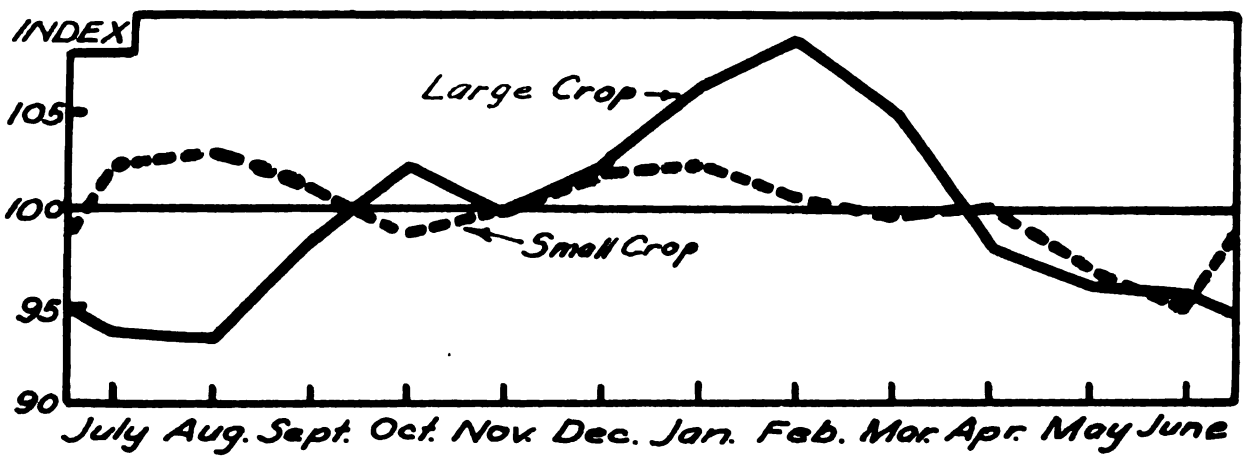


Figure 15. RYE: Indexes of Average Seasonal Variation of Michigan Farm Prices for Years Following the Harvest of Eight Large Crops and Six Small Crops Selected From the Years 1923-1942.

Summary and Conclusions. For those farmers who had rye to sell, there was no price advantage to be gained by storing beyond September in the decade 1933-1942. There was a higher premium on early marketings in 1933-1942 than during the period 1910-1919. More was gained by storing large crops than small crops, but even then, the amount gained was no more than adequate to cover costs.

FIELD BEANS

Seasonal Pattern. The seasonal price of field beans was highly erratic (Figure 16 and Table VI). The price remained below the average annual price from the beginning of the harvest season in October until the following April. From April, the price fluctuated above the annual average

Table VI - FIELD BEANS: Average Seasonal Variation of Michigan Farm Prices and Index of Irregularity, 1933-1942.

Month	Average Seasonal Variation of Prices: Index	Price per hundredweight	Index of Irregularity
	(percent)	(dollars)	(percent)
January	96.1	3.00	13.4
February	97.4	3.04	15.0
March	94.7	2.95	14.0
April	98.1	3.06	11.7
May	104.8	3.27	14.4
June	100.0	3.12	12.2
July	107.3	3.35	12.8
August	102.7	3.20	15.2
September	107.5	3.35	19.1
October	98.6	3.08	12.8
November	97.0	3.03	14.2
December	95.8	2.99	11.7
Average	100.0	3.12	13.9

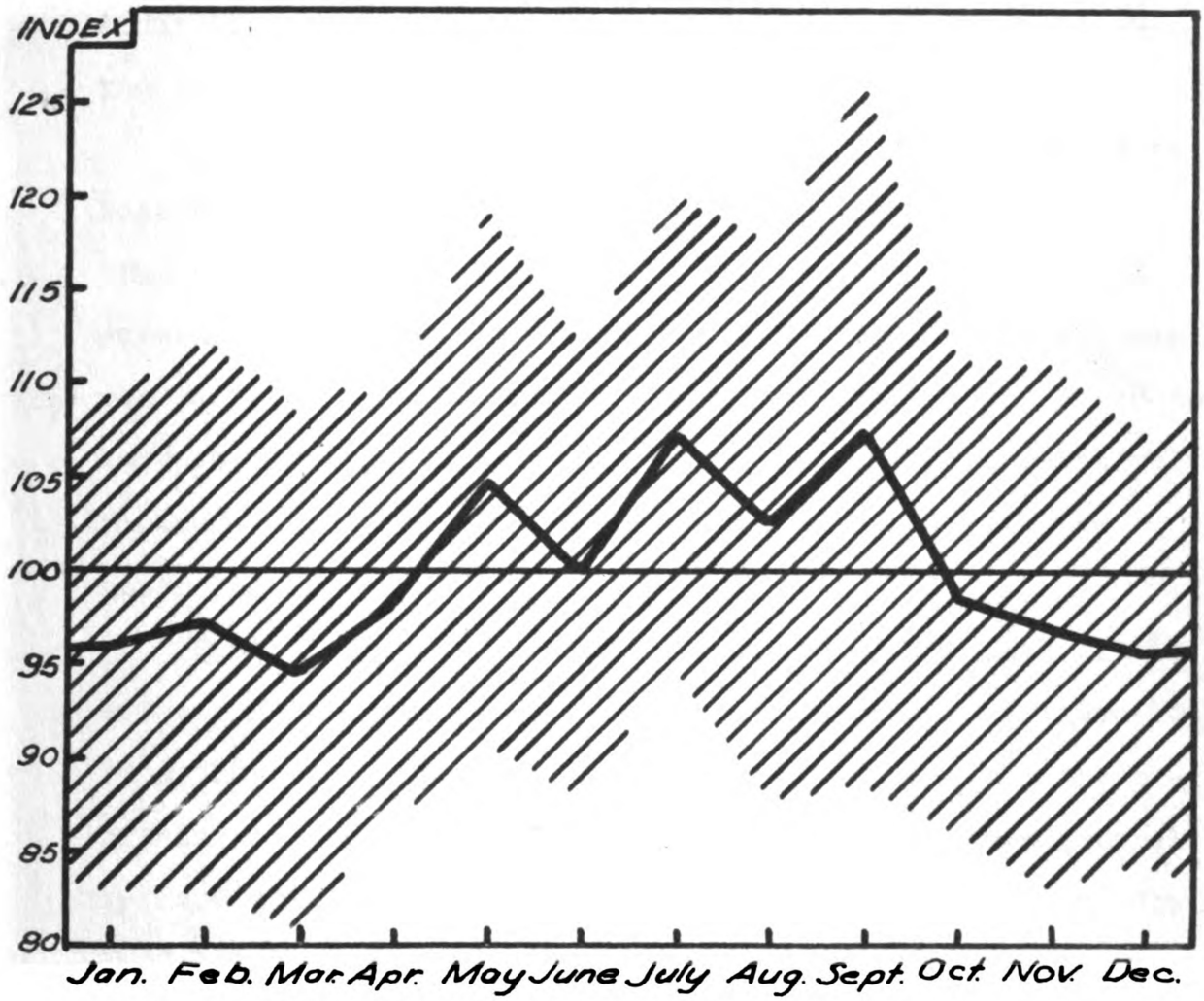


Figure 16. FIELD BEANS: Index of Average Seasonal Variation of Michigan Farm Prices and Zone Of Irregularity, 1933-1942.

price in alternate months reaching a seasonal peak in September. The wide zone of irregularity indicates a wide variation in the seasonal patterns for individual years. About 40 percent of Michigan's bean crop was marketed during the three months October, November, and December.

Comparison 1910-1919 and 1933-1942. Bean prices were less variable in 1910-1919 than in 1933-1942 (Figure 17). The seasonal variation in the earlier period was only 4 percent compared to 13 percent in 1933-1942. This corresponded to 22 and 40 cents a hundred respectively. Prior to harvest, prices remained fairly stable, but at a relatively lower level in the earlier decade as compared with the later period.

Size of Crop. Apparently the size of crop had little effect on the seasonal movement of bean prices (Figure 18). In either case, the average price dropped off from the beginning of the harvest season until December, than generally rose until the following July. Both the upward and downward trends were quite irregular.

Summary and Conclusions. The irregularity in the seasonal variation of the price of beans combined with the small amount of total variation made it rather risky to hold beans for the same number of months after harvest year after year. In several years it was possible to make speculative profits by storing beans for a period of three months to a year or more following harvest. The price was not consistently highest in any one month of the year, since the highest price

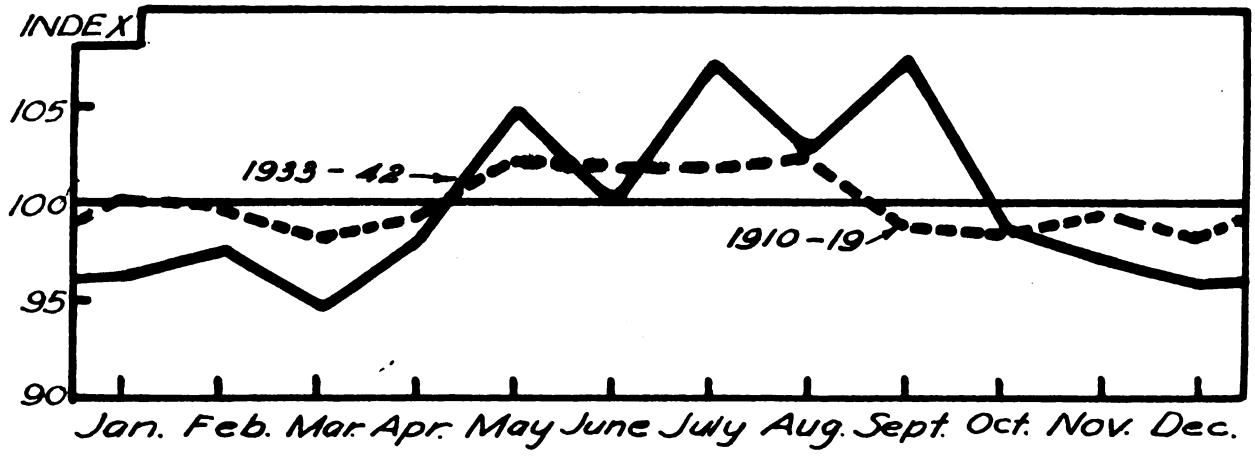


Figure 17. FIELD BEANS: Indexes of Average Seasonal Variation of Michigan Farm Prices, 1910-1919 and 1933-1942.

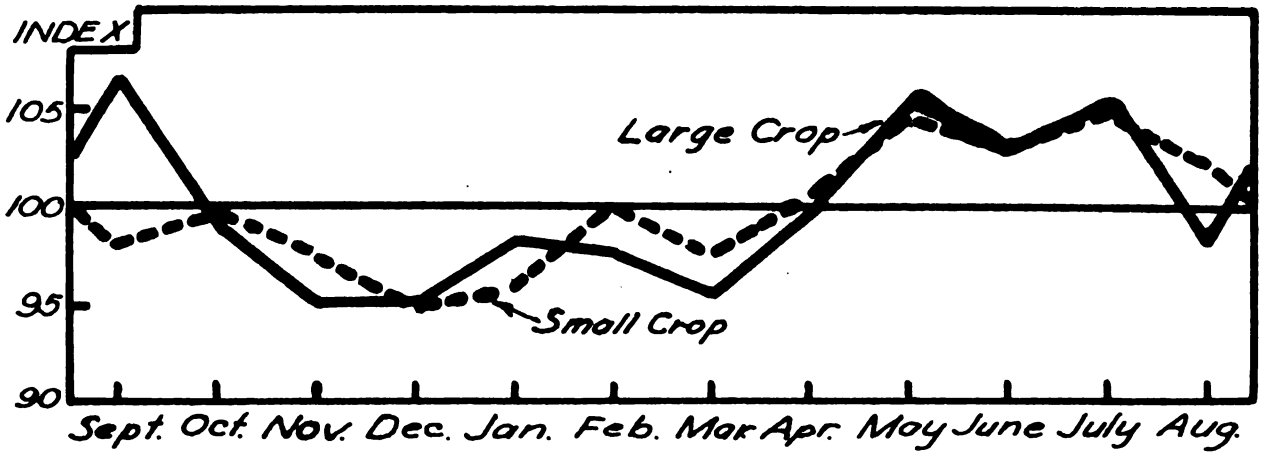


Figure 18. FIELD BEANS: Indexes of Average Seasonal Variation of Michigan Farm Prices for Years Following the Harvest of Seven Large Crops and Nine Small Crops Selected From the Years 1923-1942.

for the year occurred in eight different months in the 10 year period, 1933-1942.

Prices early in the marketing season were very close to the annual average price and remained within 3 percent of the average until December. There was little difference in the seasonal pattern regardless of the size of crop. Prices remained near the season's average early in the marketing season for either large or small crops.

POTATOES

Seasonal Pattern. The seasonal variation in the price of potatoes was great (Figure 19 and Table VII). From an index of 83 in November, prices fluctuated upward to an

Table VII - POTATOES: Average Seasonal Variation in Michigan Farm Prices and Index of Irregularity, 1933-1942.

Month	Average Seasonal Variation of Prices		
	Index	Price per bushel	Index of Irregularity
	(percent)	(dollars)	(percent)
January	92.6	.63	10.3
February	93.4	.64	14.2
March	92.3	.63	17.2
April	95.9	.65	16.7
May	91.0	.62	18.0
June	95.4	.65	23.2
July	133.1	.91	21.5
August	134.6	.92	34.8
September	114.7	.78	29.0
October	86.0	.59	11.4
November	83.0	.57	13.0
December	88.0	.60	10.4
Average	100.0	.68	18.3

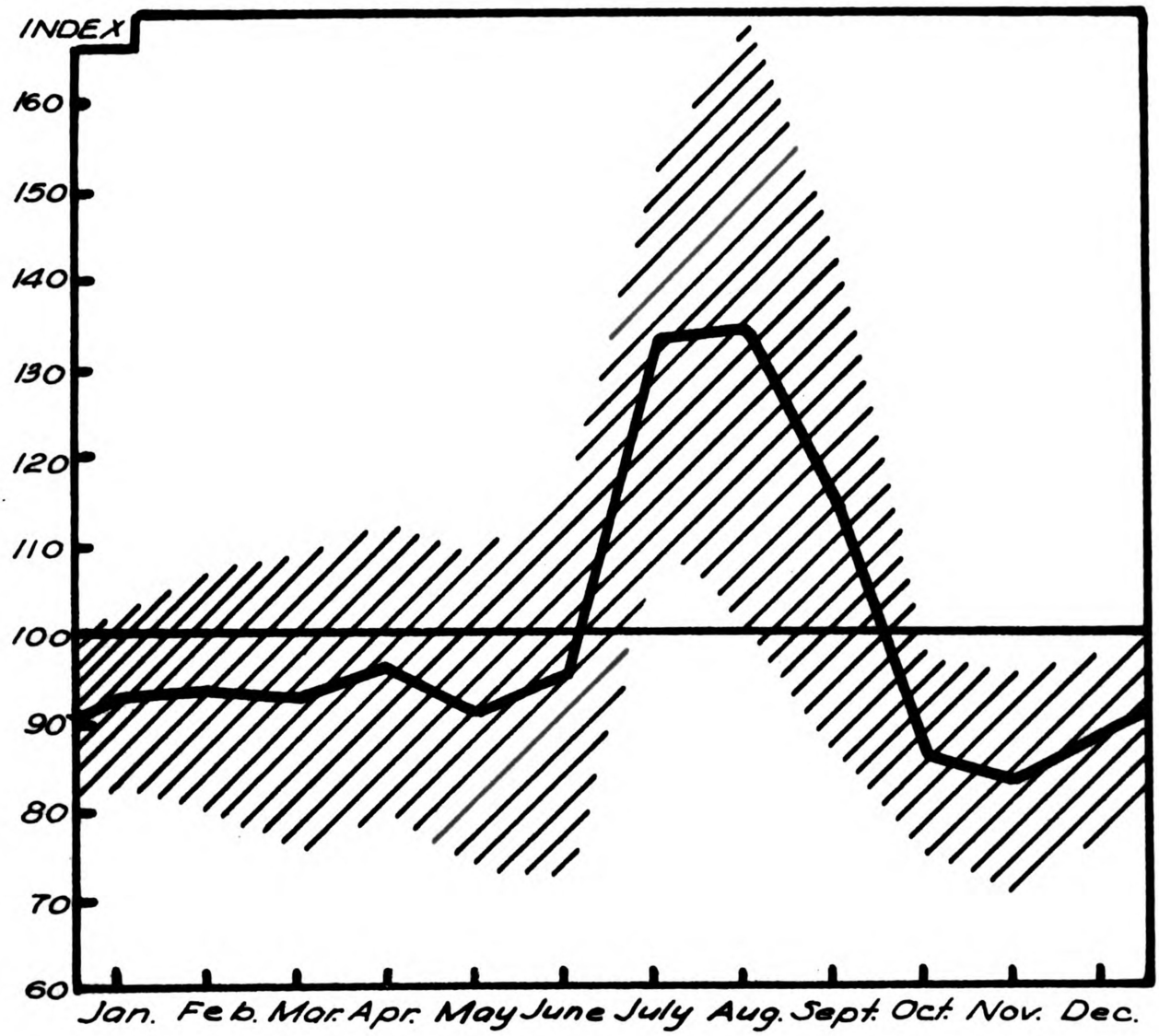


Figure 19. POTATOES: Index of Average Seasonal Variation of Michigan Farm Prices and Zone of Irregularity, 1933-1942.

index of about 135 in August. These price variations represented a difference in the location of farm sales as well as variations in prices to farmers in the same locality. Michigan farmers who sold potatoes in the high-price months were nearer the market and had considerably less freight expense than those in the upper peninsula. At present, this freight differential amounts to as much as 30 cents a bushel. About four-fifths of the potato crop was marketed by Michigan farmers rather evenly from October through April. The unusually high prices that prevailed through July and August corresponded with the period of seasonally low marketings in 1933-1942. The width of the zone of irregularity varied between 40 and 70 percent from May through September. This indicates that the price was highly variable during these months.

Comparison 1910-1919 and 1933-1942. There was very little change in the seasonal pattern of potato prices between 1910-1919 and 1933-1942 (Figure 20). Prices in 1910-1919 increased about 40 percent from June to August, then dropped to a seasonal low index of 86 by November. In both periods the difference between the high- and low-price months was 52 percent.

Size of Crop. The amount of seasonal variation in the price of potatoes was much greater following the harvest of a large crop than a small crop (Figure 21). When production was high, the seasonal price peak occured in August and the

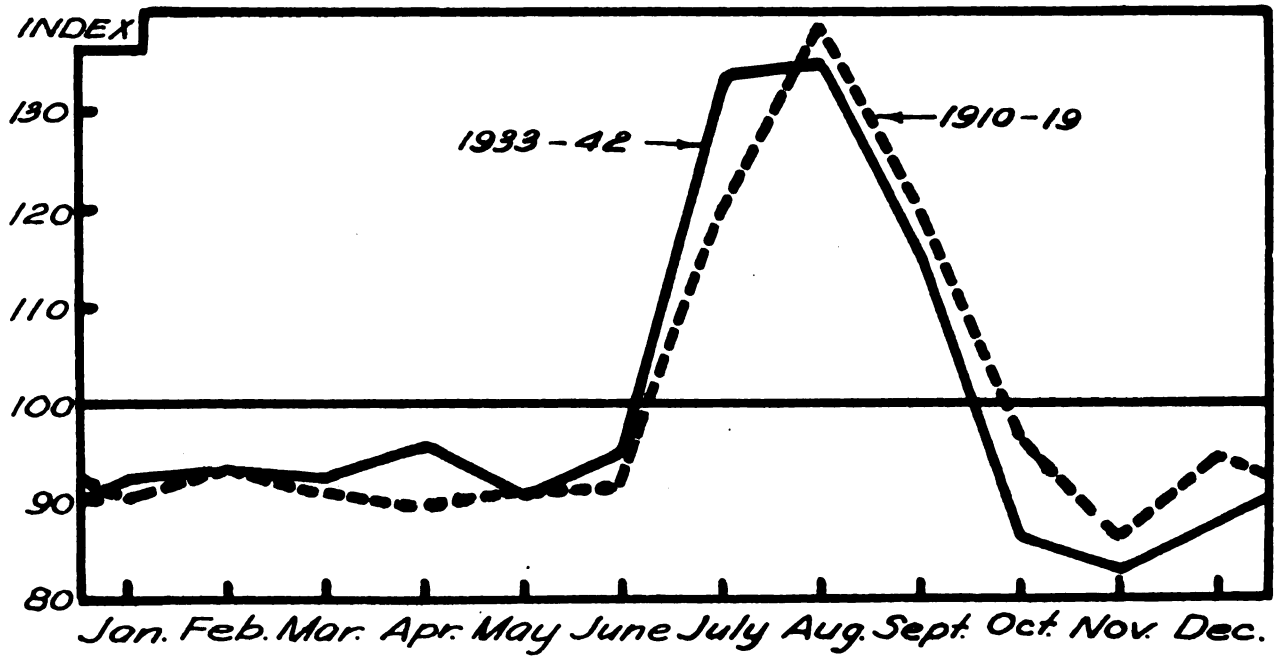


Figure 20. POTATOES: Indexes of Average Seasonal Variation of Michigan Farm Prices, 1910-1919 and 1933-1942.

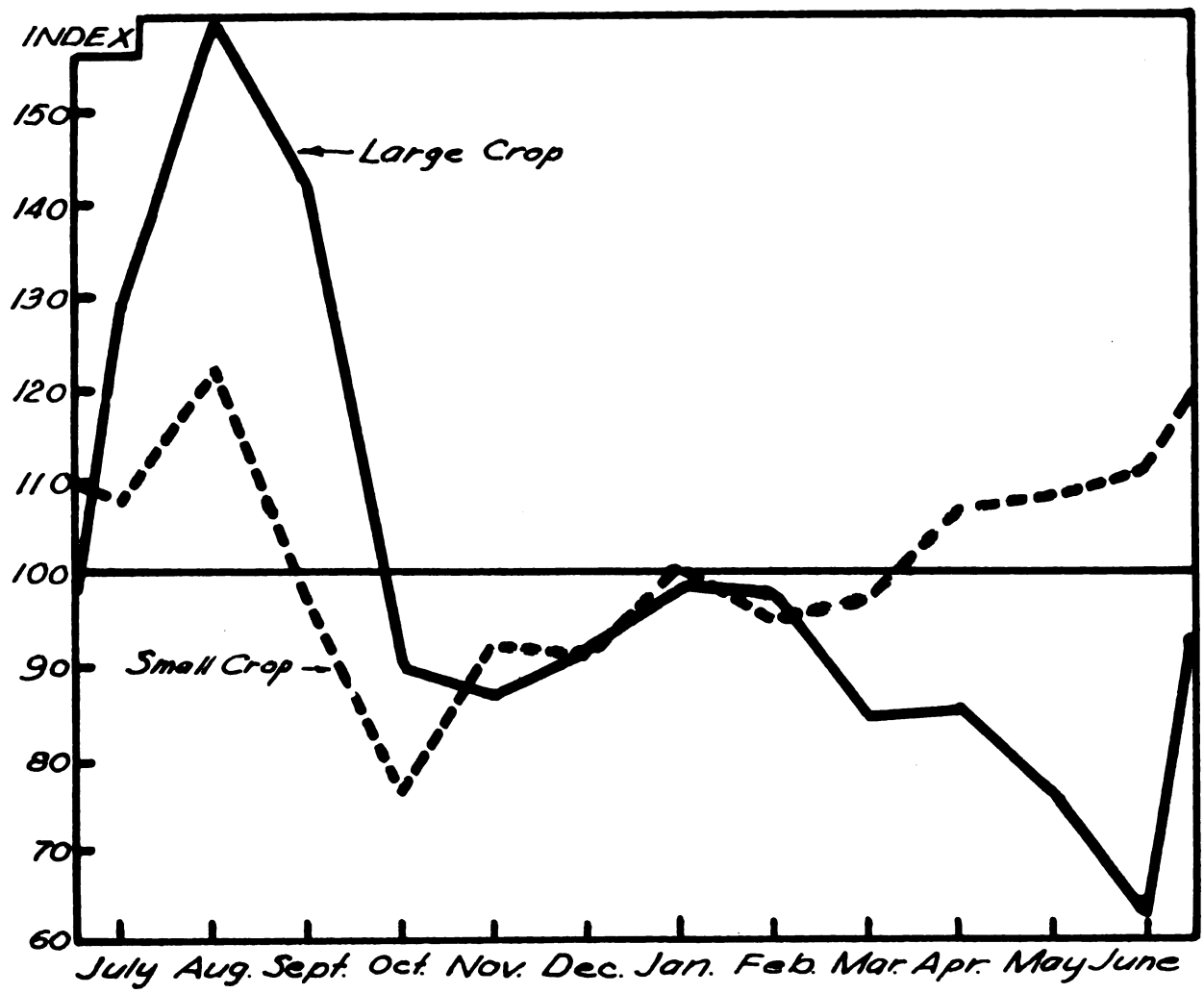


Figure 21. POTATOES: Indexes of Average Seasonal Variation of Michigan Farm Prices for Years Following the Harvest of Two Large Crops and Three Small Crops Selected From 1923-1942.

low-price month was the following June. For small crops, the peak month was August, but the low month was December. The total variation in price between the high and low months was 84 percent for large crops as compared with 31 percent for small crops. Prices in both cases fluctuated at about the same relative level from October to February, but prices in years of small crops rose following this period whereas prices in years of large crops fell.

Summary and Conclusions. Potato prices had a large amount of seasonal variation. Only in three months--July, August and September--were prices above the average annual price for the year during the periods 1910-1919 and 1933-1942. If it was impossible for Michigan farmers to market their potatoes early, there was no other price advantage until the end of the marketing season. This was true in all cases except following the harvest of a large crop, in which case prices fell rapidly after the month of January.

HAY

Seasonal Pattern. From a low in July and August to a high in February, hay prices rose about 13 percent (Figure 22 and Table VIII). This difference was about 2 percent, or 22 cents, per ton per month. Monthly prices were below the average annual price from July through December, and above the average annual price the remainder of the year. The rise

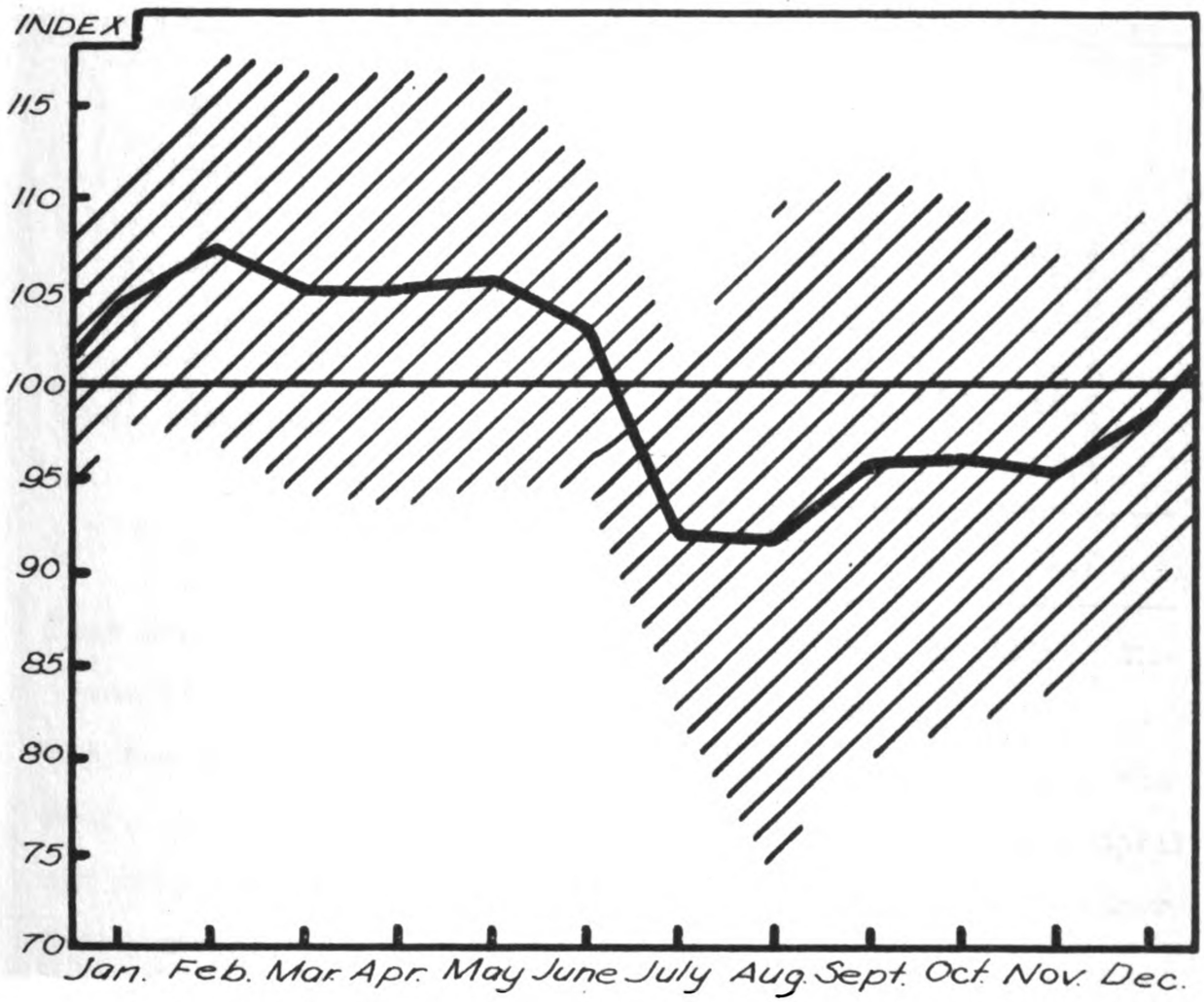


Figure 22. HAY: Index of Average Seasonal Variation of Michigan Farm Prices and Zone of Irregularity, 1933-1942.

in hay prices was more or less gradual for the first seven months following harvest. They remained fairly steady for four months, before dropping sharply from June to July. The zone of irregularity was wide--more so immediately following the harvest season than at any other time throughout the year. Heavy marketings prevailed from December through April and only one-third of the hay crop was sold during the other seven months.

Table VIII - HAY: Average Seasonal Variation of Michigan Farm Prices and Index of Irregularity, 1933-1942.

Month	Average Seasonal Variation of Prices		
	Index	Price per ton	Index of Irregularity
	(percent)	(dollars)	(percent)
January	104.3	9.00	6.2
February	107.3	9.26	10.7
March	105.1	9.07	11.5
April	105.0	9.06	11.6
May	105.5	9.10	11.1
June	103.1	8.90	8.9
July	92.0	7.94	9.8
August	91.8	7.92	17.7
September	95.8	8.27	15.8
October	96.0	8.28	14.2
November	95.3	8.22	11.8
December	98.8	8.53	11.1
Average	100.0	8.63	11.7

Comparison 1910-1919 and 1933-1942. The seasonal variation of hay prices was greater during the period 1933-1942 than in 1910-1919 (Figure 23). The greatest seasonal rise in the earlier period occured in the late spring months and reached a peak in May and June. From an average index of 94 in August, prices rose steadily to 100 in December. Prices

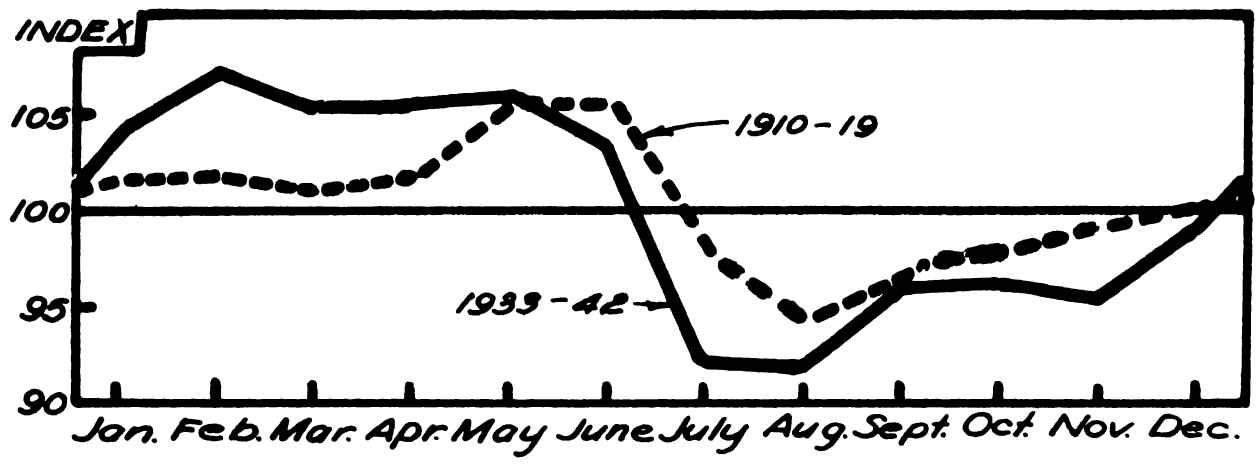


Figure 23: HAY: Indexes of Average Seasonal Variation of Michigan Farm Prices, 1910-1919 and 1933-1942.

remained only slightly above the annual average until the sharp rise just prior to harvest.

Size of Crop. There was a marked difference in the seasonal pattern of hay prices following the harvest of a large crop rather than a small crop (Figure 24). When production was high, prices rose about 4 percent per month from August until February, then fell steadily through June. The seasonal price peak following a short crop occurred in September. Prices then fell to about the average annual price level in November where they remained fairly steady until the following May and June. When production was low hay prices rose 12 percent from July to September.

Summary and Conclusions. Michigan farmers sold the bulk of their surplus hay production during the months of highest prices in 1933-1942. The seasonal variation of hay prices was greater in 1933-1942 than in 1910-1919 and the peak-price month shifted from May in the earlier, to February in the later period. When hay production was low, early marketing was wise, while later marketing was more advantageous when hay production was high.

APPLES

Seasonal Pattern. Apple prices had a pronounced seasonal pattern (Figure 25 and Table IX). From a low in September, prices rose rapidly until May, then dropped rather sharply to August and September. The difference in price

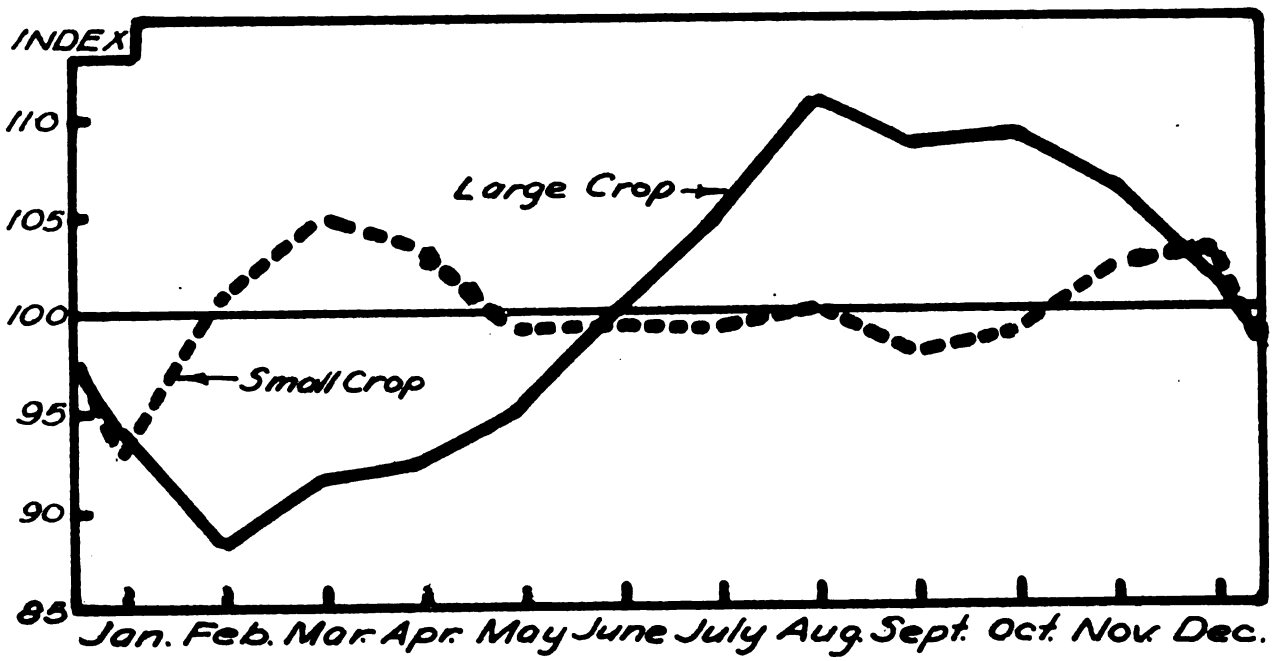


Figure 24: HAY: Indexes of Average Seasonal Variation of Michigan Farm Prices for Years Following the Harvest of Four Large Crops and Five Small Crops Selected From the Years 1923-1942.

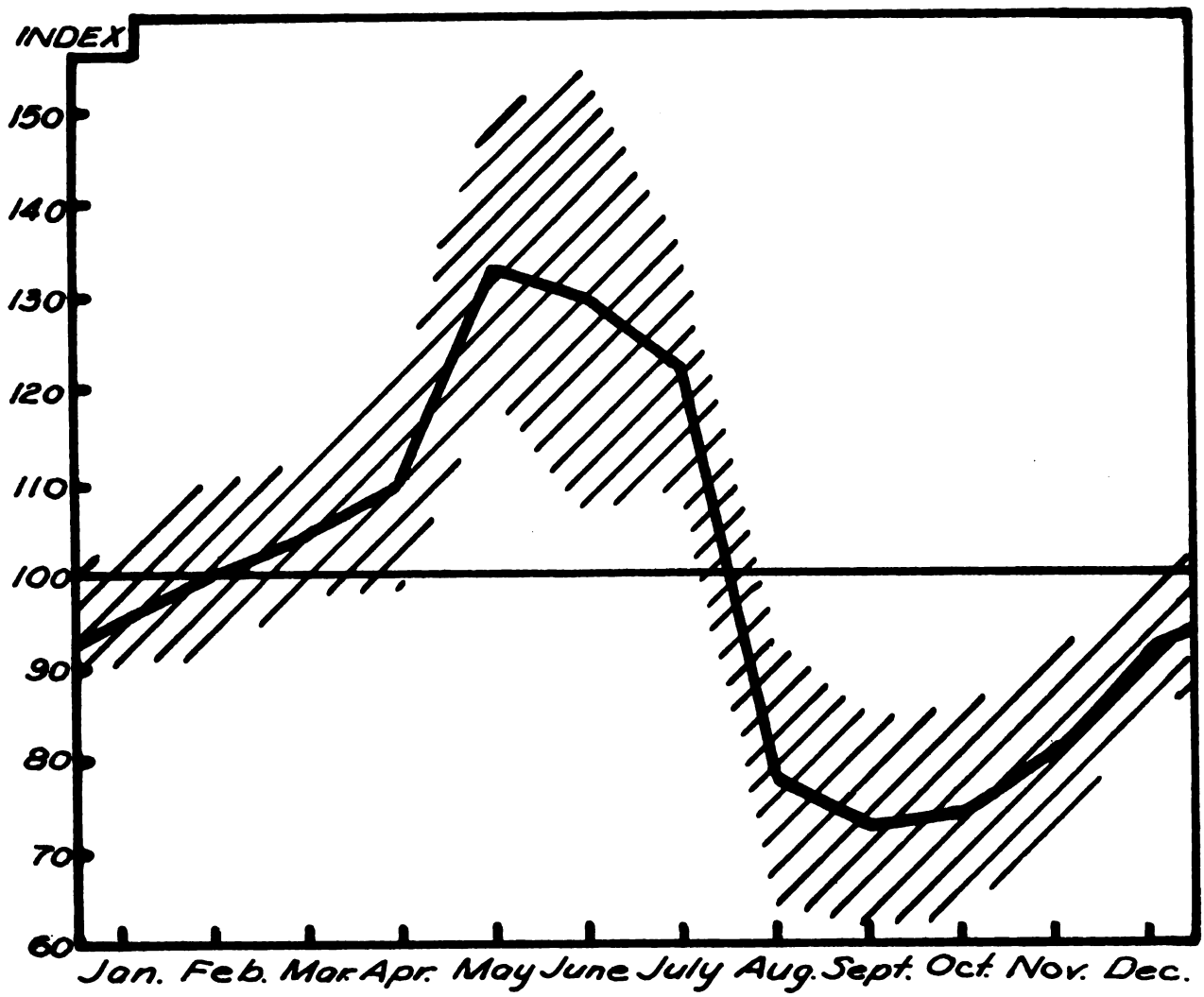


Figure 25. APPLES: Index of Average Seasonal Variation of Michigan Farm Prices and Zone of Irregularity, 1933-1942.

between the high and low months was 60 percent, which represented 59 cents per bushel during 1933-1942. Much of the difference can be attributed to the different varieties marketed during different seasons. Prices conformed more

Table IX - APPLES: Average Seasonal Variation of Michigan Farm Prices and Index of Irregularity, 1933-1942.

Month	Average Seasonal Variation of Prices		
	Index	Price per bushel	Index of Irregularity
	(percent)	(dollars)	(percent)
January	96.3	.94	6.1
February	101.0	.99	9.5
March	105.2	1.03	7.3
April	110.8	1.08	12.1
May	133.4	1.30	16.0
June	130.4	1.28	24.4
July	123.0	1.20	13.6
August	78.3	.76	14.8
September	73.1	.71	11.8
October	74.3	.73	11.5
November	81.6	.80	10.3
December	92.2	.90	7.4
Average	100.0	.98	12.1

closely to the average seasonal pattern in the winter and early spring months than at any other time throughout the year in the ten-year period.

Comparison 1910-1919 and 1933-1942. The amount of seasonal variation in apple prices was less in 1910-1919 than in 1933-1942 (Figure 26). The seasonal peak in prices occurred in April in the earlier period and was about 17 percent below the May peak of the later period. On the average,

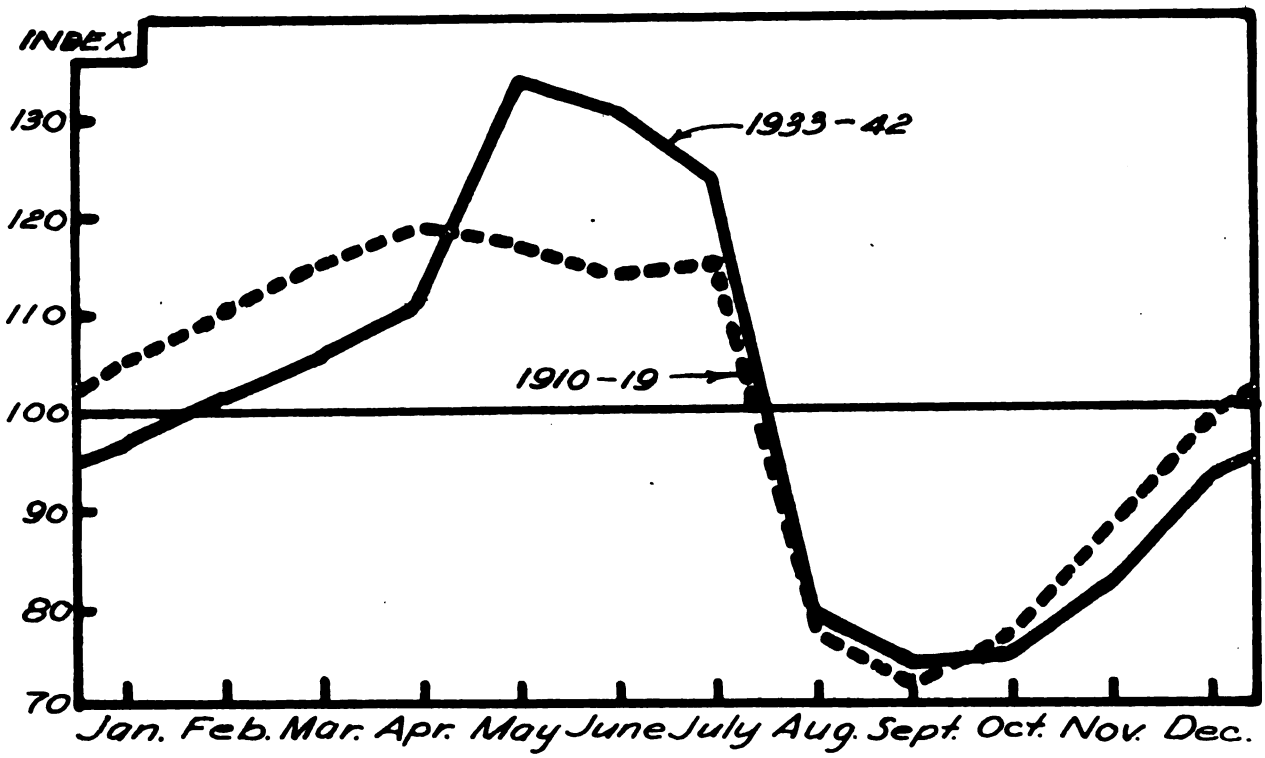


Figure 26. APPLES: Indexes of Average Seasonal Variation of Michigan Farm Prices, 1910-1919 and 1933-1942.

prices fell from April to May in 1910-1919, whereas they rose rapidly from April to May in the more recent 10-year period.

Size of Crop. The size of the apple crop apparently had some effect on the seasonal price movement but the difference was not great (Figure 27). When a large crop was harvested prices fell more rapidly and recovered more rapidly than when a small crop was harvested. The peak and low months coincided, and the peak prices on an index basis were about the same whether production was high or low.

Summary and Conclusions. Apple prices were highly seasonal and rose about 7 percent per month from September to May in 1933-1942, on the average. A severe seasonal drop in apple prices occurred from July to August. The change in the seasonal pattern of apples from 1910-1919 and 1933-1942 tended to place a greater price premium on apples from May to July. It was more advantageous to store apples following the harvest of a large crop than a small crop as the seasonal rise in price was greater immediately following the harvest of a large crop.

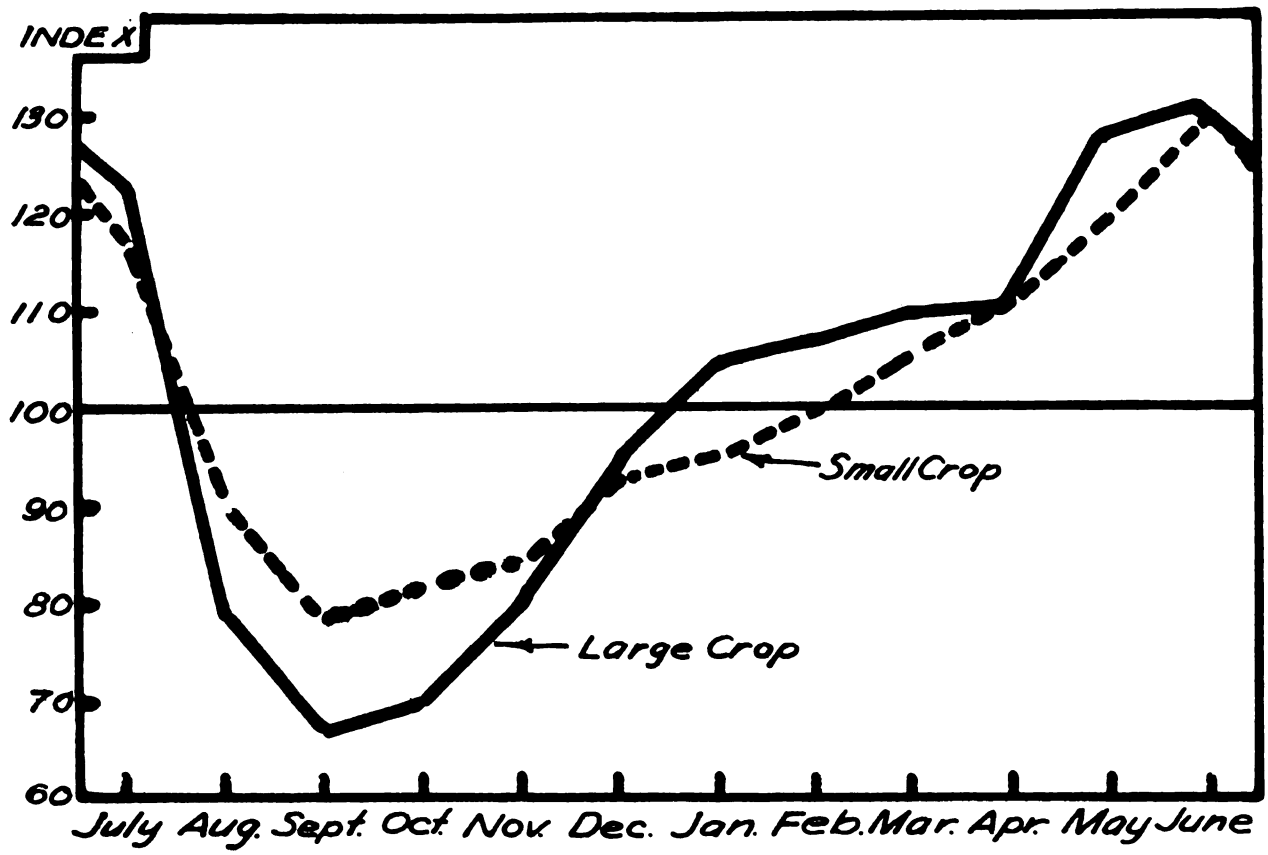


Figure 27. APPLES: Indexes of Average Seasonal Variation of Michigan Farm Prices for Years Following the Harvest of Five Large Crops and Seven Small Crops Selected From the Years 1923-1942.

PART II

LIVESTOCK AND LIVESTOCK PRODUCTS

The production of livestock and livestock products does not vary as much from one season to another as crop production. Therefore, there is a more even flow of these products to market. However, the prices of livestock and livestock products are higher in certain times of the year than others. The amount of seasonal variation in price is closely related to the volume of farm marketings. Some of the livestock and their products have regular seasonal price movements year after year, while others vary greatly. Improved or new storage and production practices may reduce the amount of seasonal price variation. This has been true for dairy products and may be true for other livestock products in the future. In the following section the average seasonal variation in the prices of livestock and livestock products for selected periods from 1910 to 1942 are reviewed.

HOGS

Seasonal Pattern. There were two seasonal peaks in hog prices (Figure 28 and Table X). One occurred in March and the other in September, with the September peak averaging about 10 percent higher than the March peak. Prices were lowest in December, at an index of 89, while prices slumped about 3 percent from the lower peak in March to an index of

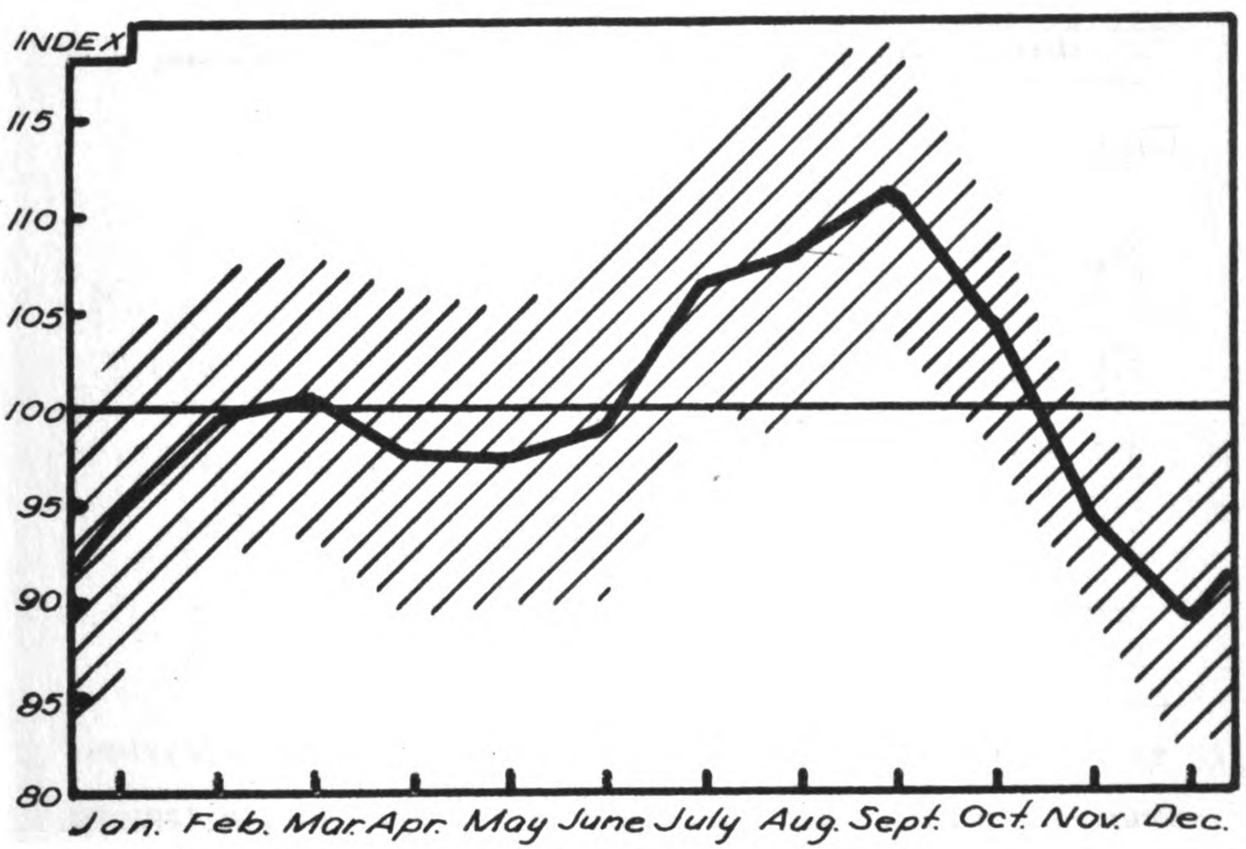


Figure 28. HOGS: Index of Average Seasonal Variation of Michigan Farm Prices and Zone of Irregularity, 1933-1942.

97 in April and May. These two seasonal peaks and their subsequent troughs were due to the two-litter system of hog

Table X - HOGS: Average Seasonal Variation of Michigan Farm Prices and Index of Irregularity, 1933-1942.

Month	Average Seasonal Variation of Prices		
	Index	Price per hundredweight	Index of Irregularity
	(percent)	(dollars)	(percent)
January	94.7	8.84	9.0
February	99.3	9.26	8.0
March	100.6	9.39	7.5
April	97.6	9.11	8.7
May	97.4	9.09	7.7
June	98.8	9.22	8.9
July	106.2	9.91	6.4
August	107.8	10.06	9.9
September	111.1	10.37	7.9
October	104.0	9.70	6.5
November	93.9	8.76	4.9
December	88.6	8.27	7.3
Average	100.0	9.33	7.7

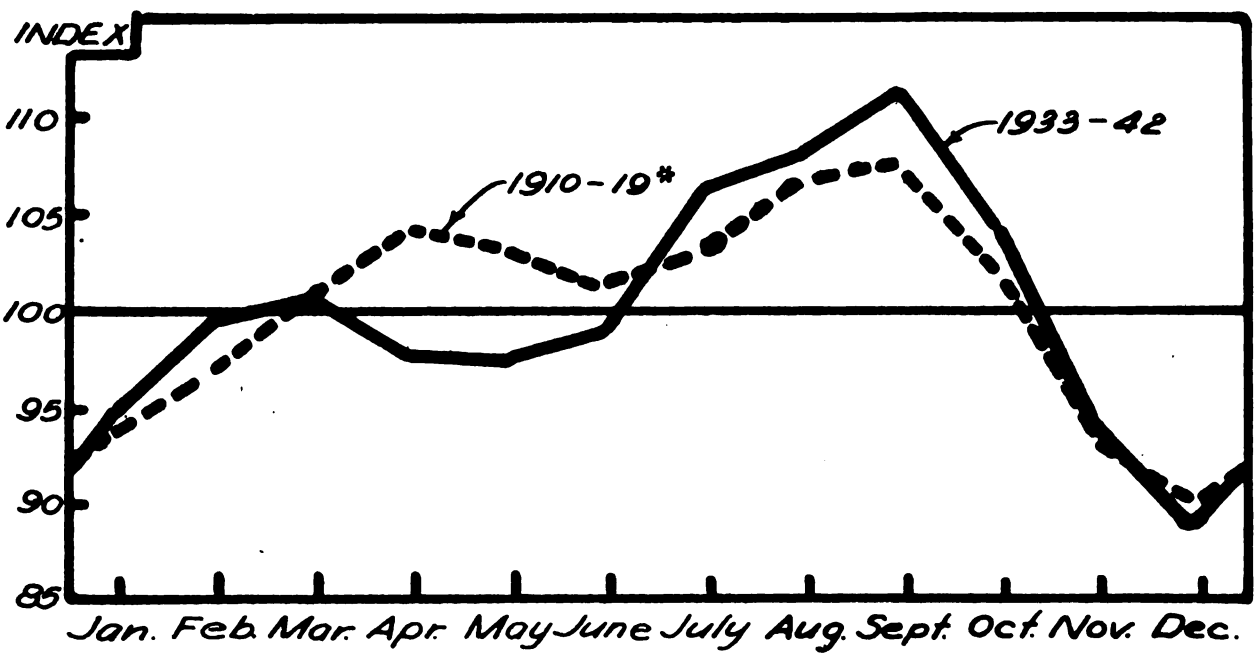
production practiced by corn-belt farmers. Approximately 55 percent of the pigs in Michigan were farrowed in the spring and 45 percent in the fall. The September peak in prices occurred before the heavy marketings of spring pigs began and the March peak was reached at the beginning of the period of heavy marketings of fall pigs. The zone of irregularity of hog prices was relatively narrow in October and November, the months of declining prices and heavy marketings.

Comparison 1910-1919 and 1933-1942. Between 1910-1919 and 1933-1942, the spring peak of hog prices declined and the

fall peak increased--the result of the shift of hogs into the western corn belt where the one-litter system is practiced (Figure 29). September continued to be the month of highest prices and December the month of lowest prices. In 1910-1919, the spring peak in hog prices was in April, followed by a decline to a summer low in June. This showed a tendency for the spring peak and the summer low in hog prices to occur earlier in 1933-1942 than in 1910-1919.

Rising or Falling Prices. When all farm prices were rising, the seasonal variation in hog prices was significantly different than when prices were falling (Figure 30). During periods of rising prices, the seasonal low in hog prices occurred in January and the seasonal peak was September. The spring peak was low compared to the annual average and prices fluctuated unevenly from March through June. Hog prices were above the annual average from July through December even though prices dropped sharply after September. When all farm prices were falling, the seasonal peak in hog prices was in March and the low in December. Hog prices fell from March to May, then rose to a minor peak in July, and declined again to December during periods of falling prices.

Summary and Conclusions. Hog prices usually rose to a minor peak in March, declined, and then rose to a higher peak in September. The fall peak was relatively higher and the spring peak relatively lower in 1933-1942 than in



*January to June 1910 not included.

Figure 29. HOGS: Indexes of Average Seasonal Variation of Michigan Farm Prices, 1910-1919 and 1933-1942.

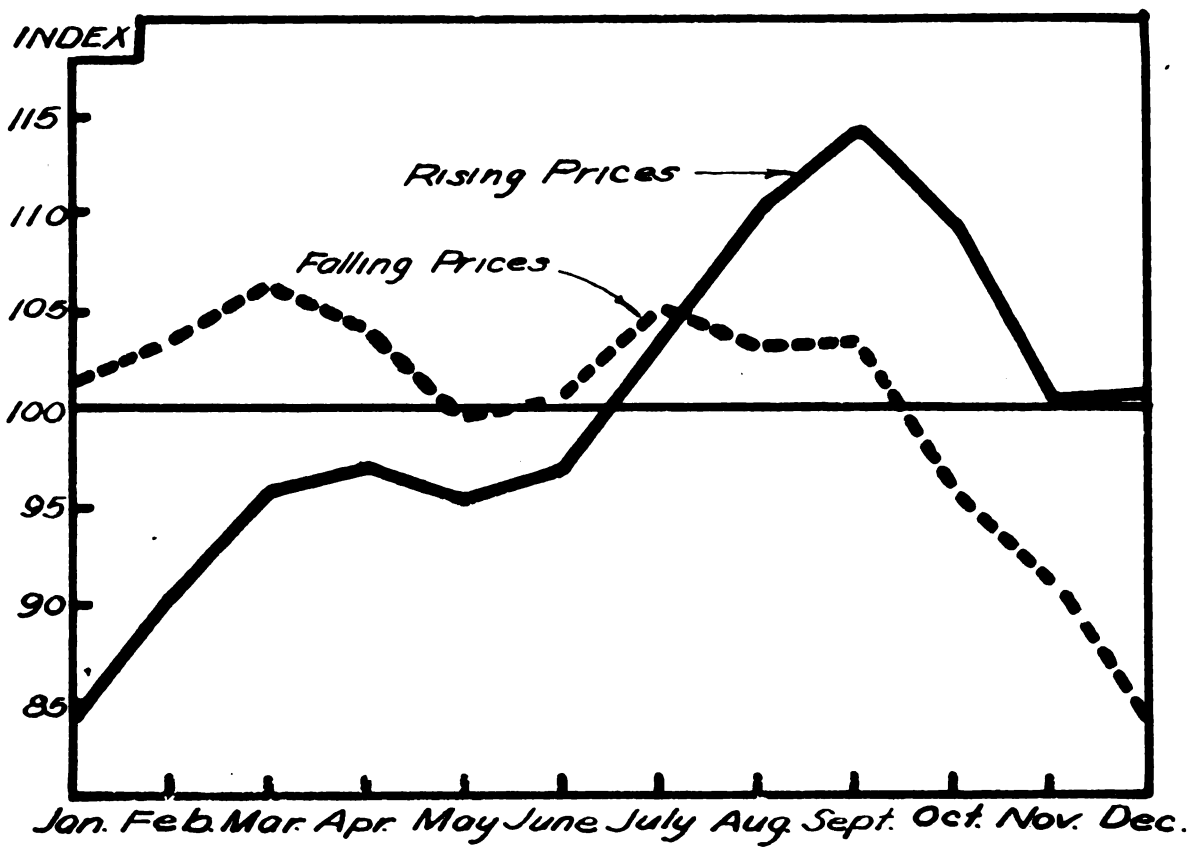


Figure 30. HOGS: Indexes of Average Seasonal Variation of Michigan Farm Prices for Six Years of Rising and Five Years of Falling Prices Selected From the Years 1923-1942.

1910-1919. When all farm prices were rising, hog prices were more favorable in the fall and early winter months than when all farm prices were falling. Earlier marketing of hogs in both the spring and fall was more advantageous during periods of falling prices than during periods of rising prices.

CATTLE

Seasonal Pattern. Average Michigan cattle prices followed a regular seasonal pattern and were highest in May and lowest in December (Figure 31 and Table XI). The total

Table XI - CATTLE: Average Seasonal Variation of Michigan Farm Prices and Index of Irregularity, 1933-1942.

Month	Average Seasonal Variation of Prices		
	Index	Price per hundredweight	Index of Irregularity
	(percent)	(dollars)	(percent)
January	96.7	6.23	6.1
February	97.4	6.27	5.8
March	100.5	6.47	8.5
April	102.1	6.58	6.9
May	105.8	6.81	8.3
June	105.4	6.79	5.6
July	104.3	6.72	4.1
August	102.8	6.62	5.4
September	102.1	6.58	5.2
October	97.2	6.26	4.8
November	93.1	6.00	8.6
December	92.6	5.96	8.7
Average	100.0	6.44	6.5

amount of variation between May and December was 13 percent. The zone of irregularity was widest in the low-price months

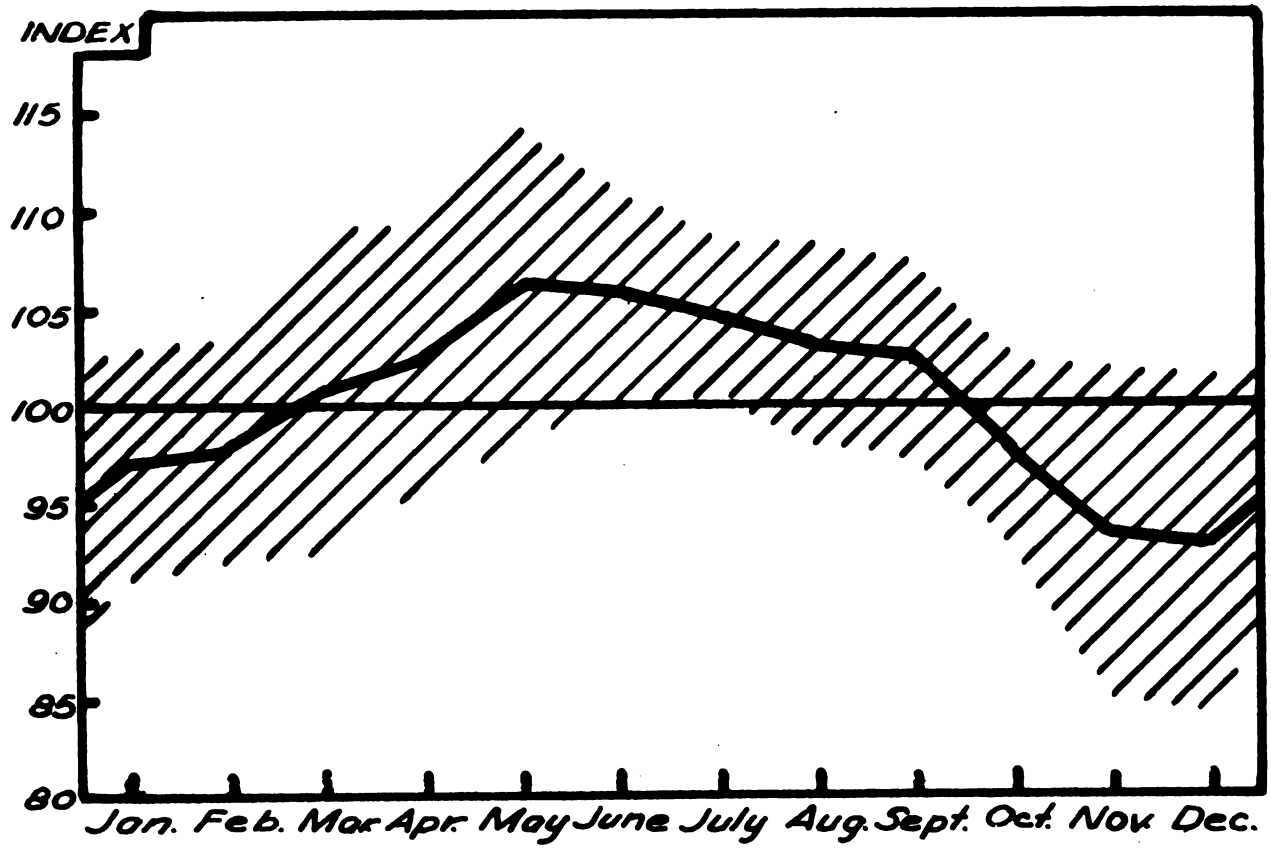


Figure 31. CATTLE: Index of Average Seasonal Variation of Michigan Farm Prices and Zone of Irregularity, 1933-1942.

of November and December, but was relatively narrow in the summer and early fall months. Monthly marketings were fairly steady throughout the year. They tended to be slightly above average from March through June as well as in January and October. The months of low marketings were December and February.

Comparison 1910-1919 and 1933-1942. The seasonal variation in cattle prices was less in 1933-1942 than in the earlier period (Figure 32). The total variation between May and December was 16 percent in 1910-1919. As was the case in 1933-1942, the seasonal pattern was regular throughout the year in the period 1910-1919.

Rising or Falling Prices. Cattle prices rose from the first of the year until May, remained fairly steady for four months, then slumped off after September during years of rising farm prices (Figure 33). Aside from a small rise in April, cattle prices fell steadily throughout the year when farm prices were falling. The amount of variation between the high and low months was about the same in either case.

Effect of Grades on Seasonal Pattern. Various grades of beef cattle at Chicago had different seasonal price patterns in 1933-1942. The price of choice and prime cattle were lowest in June, and rose to a seasonal peak in October (Figure 34). From October, prices dropped to November and remained fairly stable until April after which time they dropped to the seasonal low in June. Good grade beef prices were highest in September (Figure 35). From September they

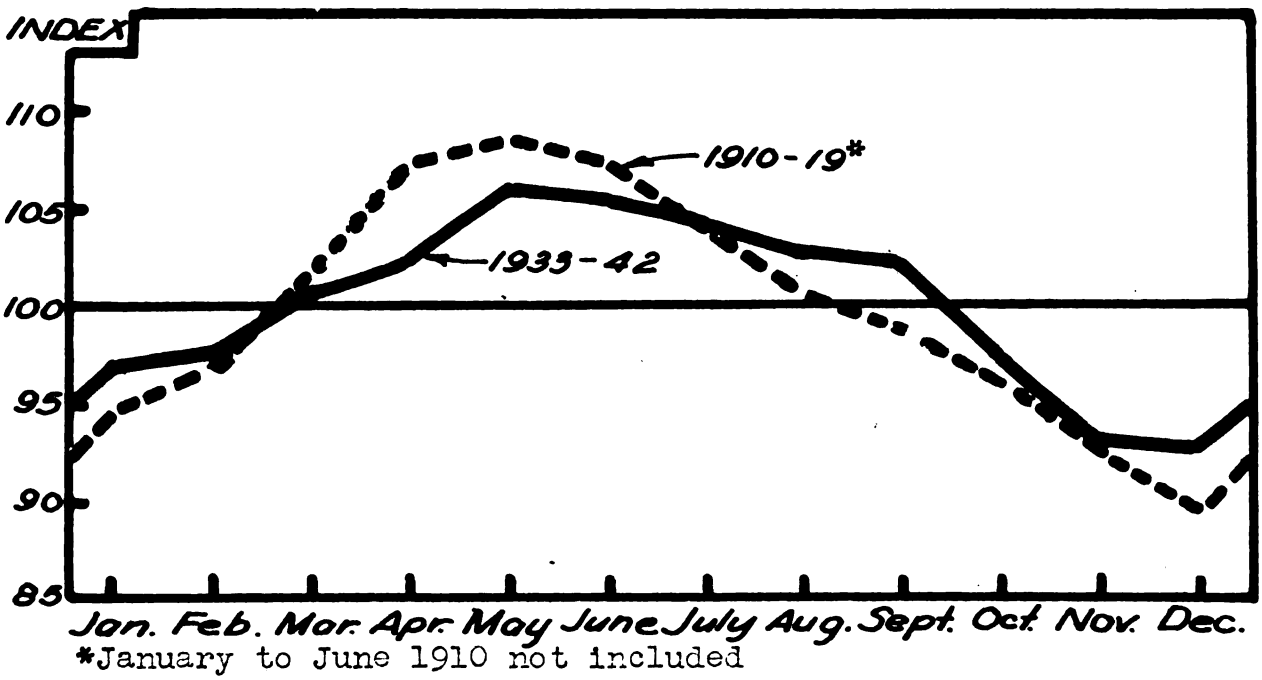


Figure 32. CATTLE: Indexes of Average Seasonal Variation of Michigan Farm Prices, 1910-1919 and 1933-1942.

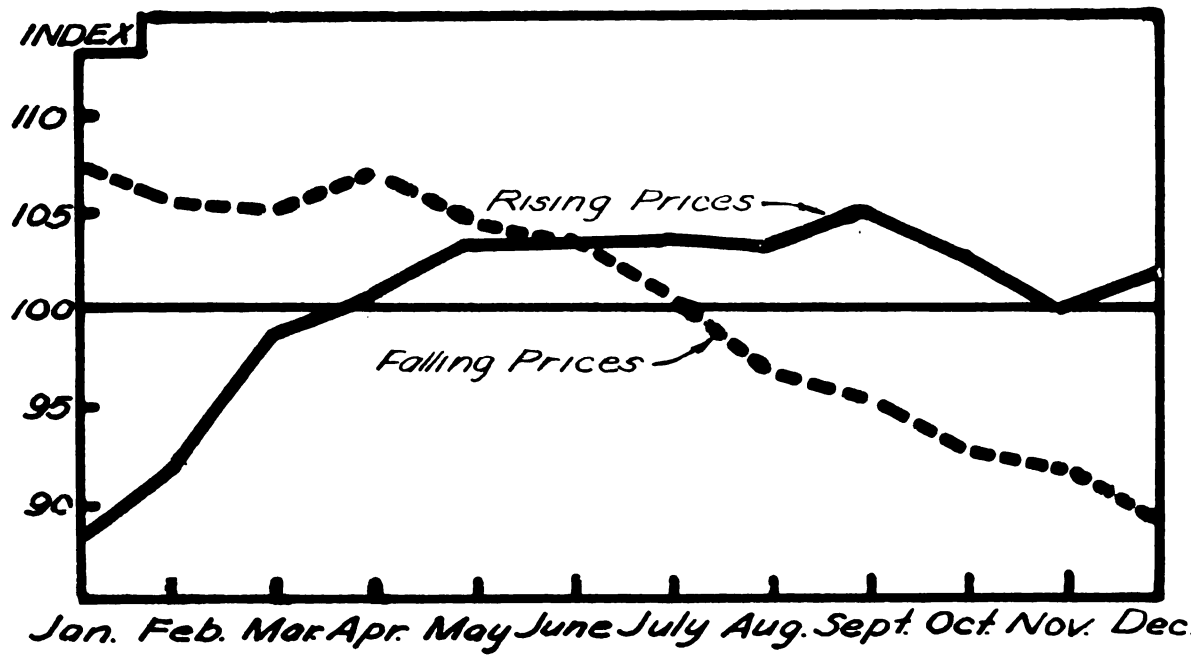


Figure 33. CATTLE: Indexes of Average Seasonal Variation of Michigan Farm Prices for Six Years of Rising Prices and Five Years of Falling Prices Selected from the Years 1923-1942.

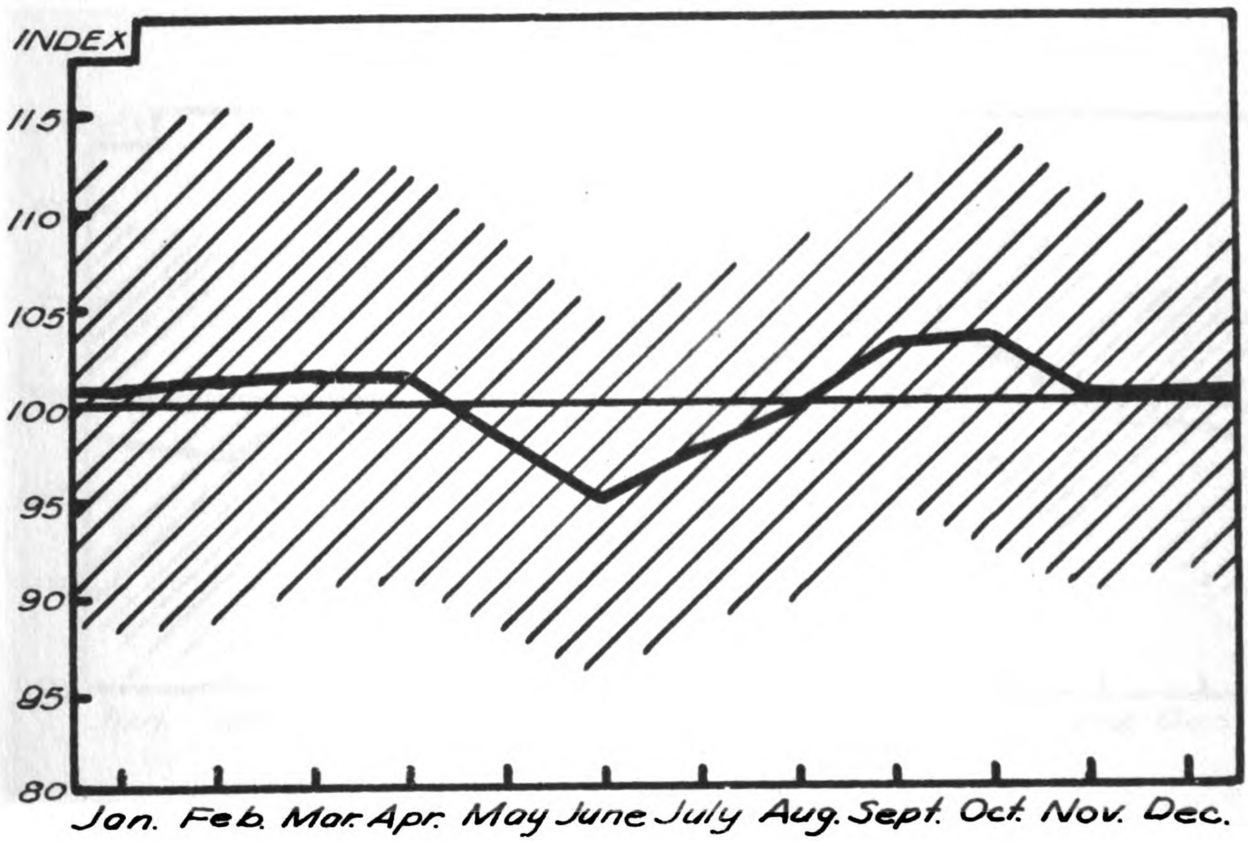


Figure 34. CATTLE: Index of Average Seasonal Variation in the Prices of Choice and Prime Grade Steers at Chicago and Zone of Irregularity, 1933-1942.

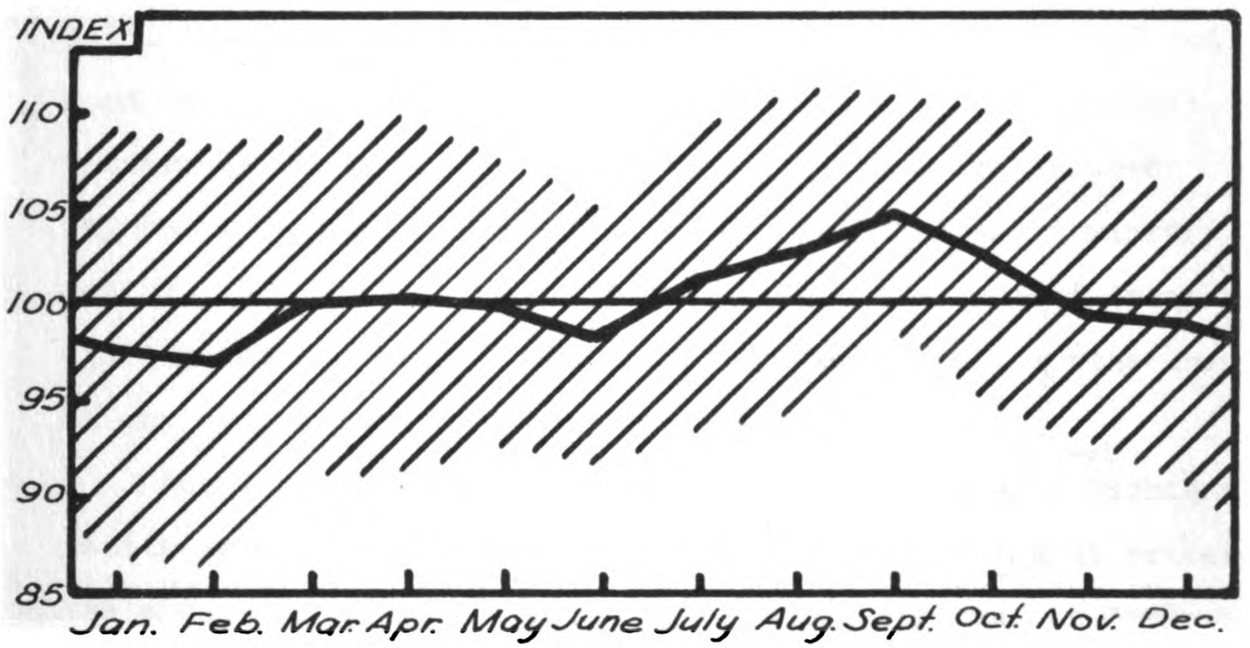


Figure 35. CATTLE: Index of Average Seasonal Variation in the Prices of Good Grade Steers at Chicago and Zone of Irregularity, 1933-1942.

fell to a seasonal low in February, then rose again and remained at about the average annual price until June. From June they climbed to the seasonal peak in September. The highest prices for medium beef was received during the late spring, summer, and early fall months (Figure 36). Prices dropped from September to November, then fluctuated upward until the late spring months. The prices of common beef and good grade cows at Chicago followed about the same seasonal pattern (Figures 37 and 38). Prices of these grades were highest in May and lowest in the late fall and early winter months. For all of the different grades, the zone of irregularity was narrower in the summer and early fall months than at any other time throughout the year.

Summary and Conclusions. Monthly marketings of Michigan cattle were above average during the months of highest prices. The amount of seasonal variation in cattle prices was 3 percent less in 1933-1942 than in 1910-1919. During periods of rising prices, cattle prices averaged higher in the fall and early winter months. When all farm prices were falling, cattle prices fell throughout the year. For different grades of beef at Chicago, the seasonal price pattern was quite different. The average price differential between the different grades included was one to two dollars per hundredweight from good grade cows up to the choice and prime grades. The seasonal movement of the Michigan farm price of cattle was similar to the seasonal pattern of good grade cows and common

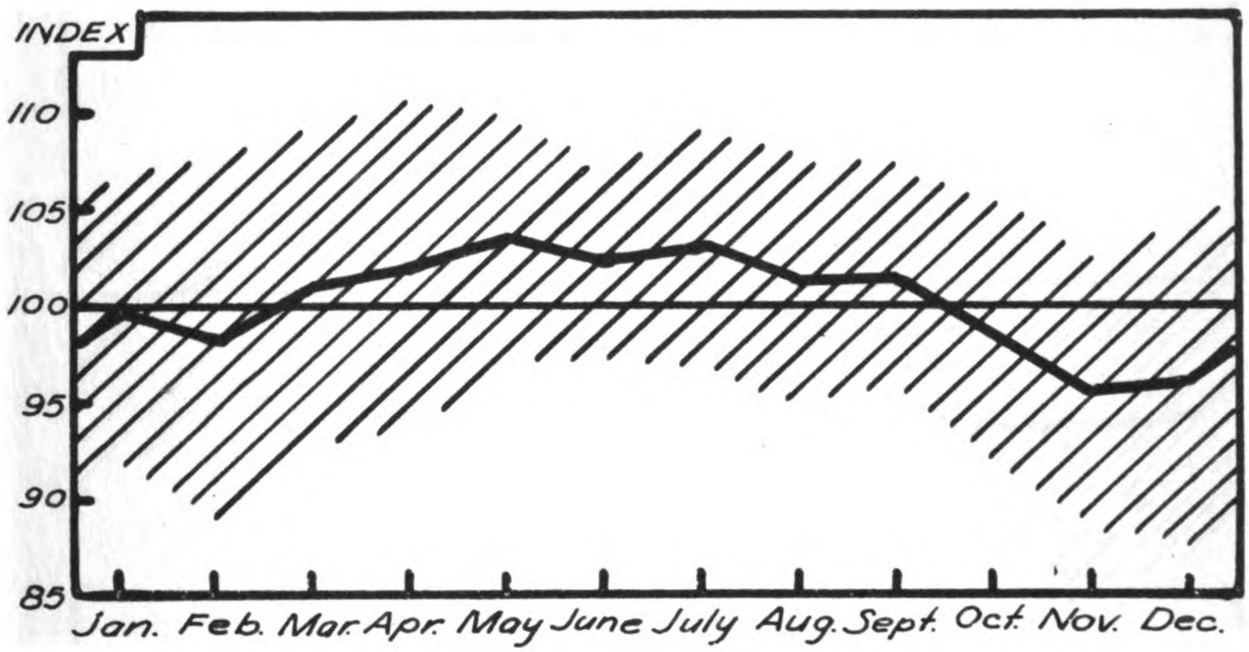


Figure 36. CATTLE: Index of Average Seasonal Variation in the Prices of Medium Grade Steers at Chicago and Zone of Irregularity, 1933-1942.

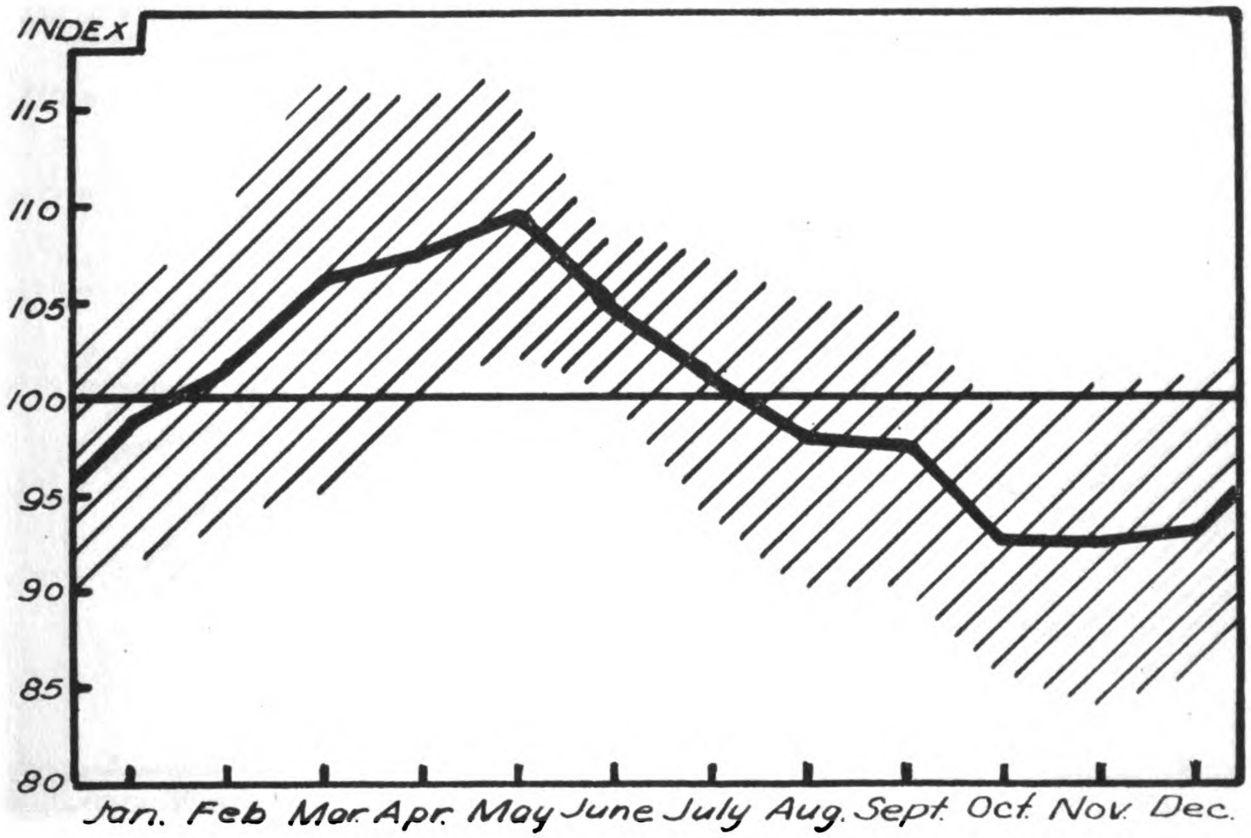


Figure 37. CATTLE: Index of Average Seasonal Variation In the Price of Common Grade Steers at Chicago and Zone of Irregularity, 1933-1942.

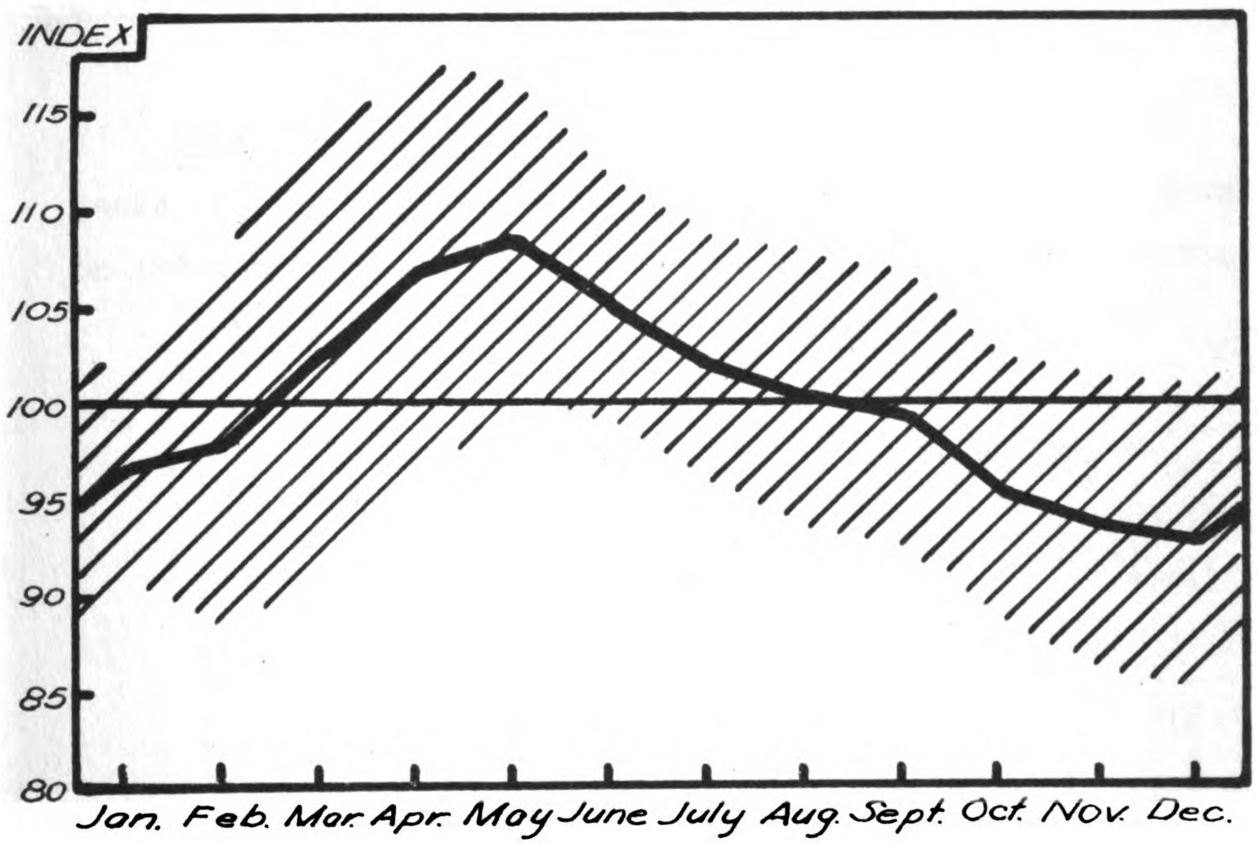


Figure 38. CATTLE: Index of Average Seasonal Variation in the Prices of Good Grade Cows at Chicago and Zone of Irregularity, 1933-1942.

beef at Chicago in 1933-1942--an indication that the bulk of the Michigan cattle sales was made up of cull dairy stock.

CALVES

Seasonal Pattern. Veal calf prices had two seasonal peaks and two seasonal lows (Figure 39 and Table VII). From an index of 108 in February, prices dropped 15 percent until

Table XII - CALVES: Average Seasonal Variation of Michigan Farm Prices and Index of Irregularity, 1933-1942.

Month	Average Seasonal Variation of Prices		
	Index	Price per hundredweight	Index of Irregularity
	(percent)	(dollars)	(percent)
January	104.9	9.88	8.9
February	107.9	10.16	5.8
March	102.8	9.68	5.3
April	97.7	9.20	5.4
May	94.0	8.85	5.3
June	91.7	8.64	9.1
July	93.1	8.77	8.8
August	98.2	9.25	5.8
September	105.9	9.98	4.8
October	105.0	9.89	3.9
November	100.0	9.42	5.5
December	98.8	9.31	7.2
Average	100.0	9.42	6.3

June. Prices steadily rose from June to a minor seasonal peak of 106 in September then fell again to 99 in December. The zone of irregularity was wider in the summer and winter than during the spring and fall months. About one-third of the veal calves were marketed in April, May, and June--the months of lowest prices.

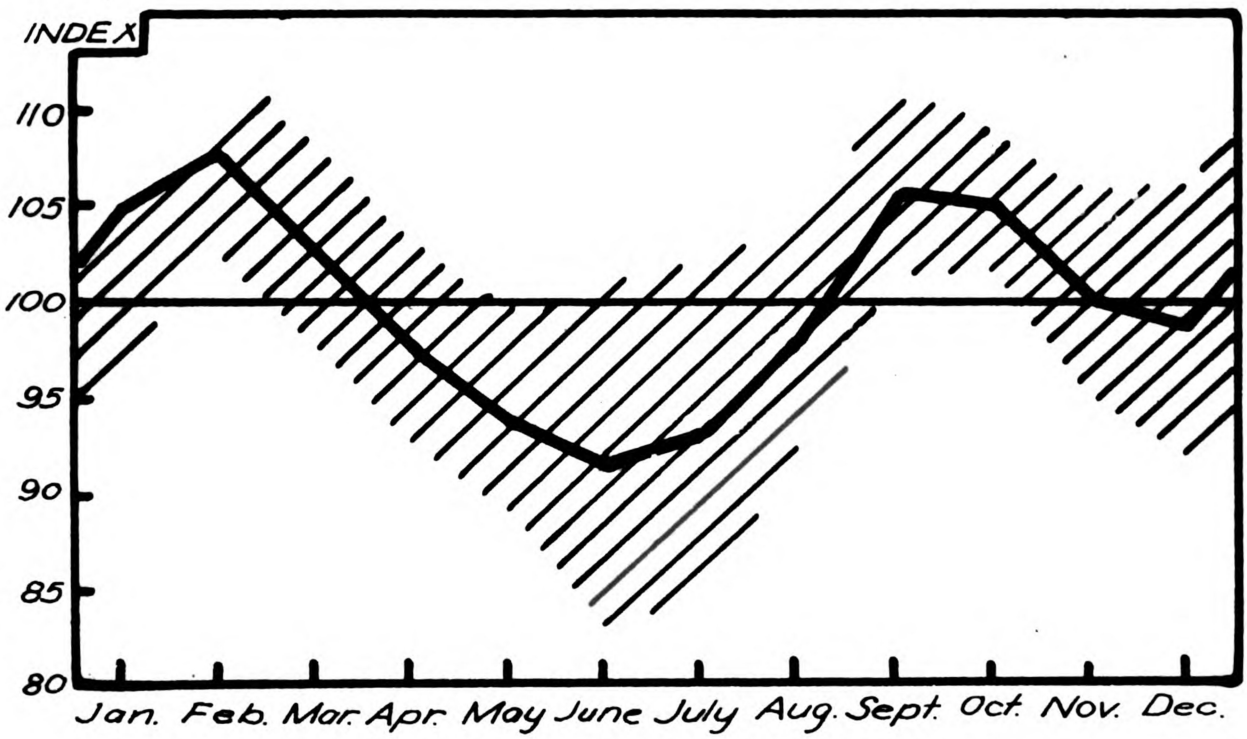


Figure 39. CALVES: Index of Average Seasonal Variation of Michigan Farm Prices and Zone of Irregularity, 1933-1942.

Comparison 1910-1919 and 1933-1942. The seasonal variation in the price of veal calves was greater in 1933-1942 than in the earlier decade (Figure 40). Prices were lowest in May and highest in September in 1910-1919, and the total variation was about 11 percent. Following September, prices dropped to November, then fluctuated above average to March before dropping to the seasonal low in May.

Rising or Falling Prices. When farm prices were falling, the price of veal calves dropped sharply from a high in January to a low in May (Figure 41). The recovery was gradual following May to September and October after which time calf prices fell again to December. When farm prices were rising, the price of veal calves rose from January to above average in February and March before dropping to a low in June. The rise from June to the seasonal high in September and October was rapid and the subsequent drop was slight.

Summary and Conclusion. Veal calves were primarily of dairy origin and were marketed one to two months after the cows freshened. Since most of the cows freshened either in the spring or fall, the price of veal calves was depressed in the one or two months following. The seasonal pattern was more variable in 1933-1942 than in 1910-1919, since more cows freshened either in the spring or fall months in the later decade. Veal calf prices were more favorable earlier in the year and less favorable toward the end of the year when all farm prices were falling than when they were rising.

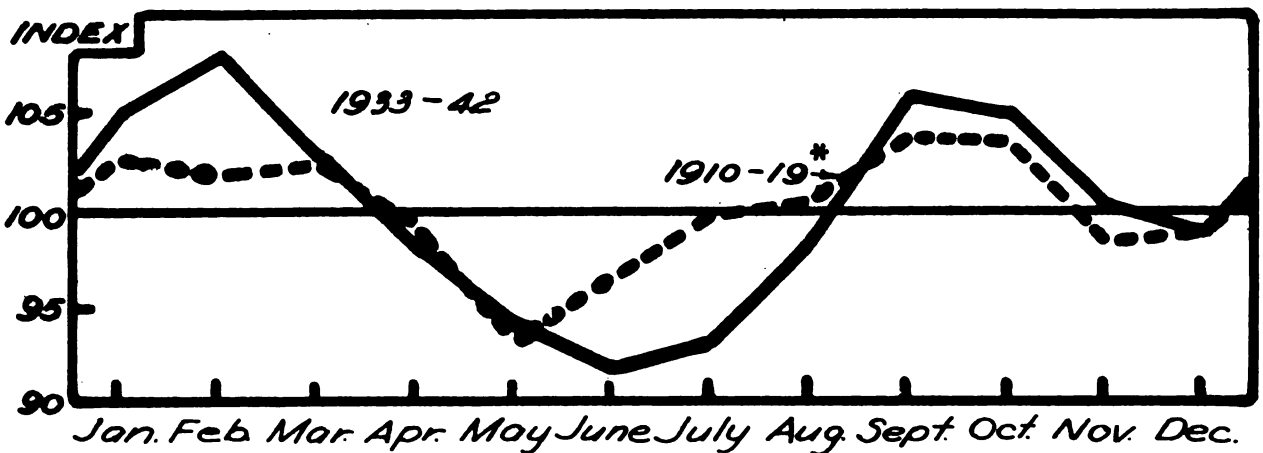


Figure 40. CALVES: Indexes of Average Seasonal Variation of Michigan Farm Prices, 1910-1919 and 1933-1942.

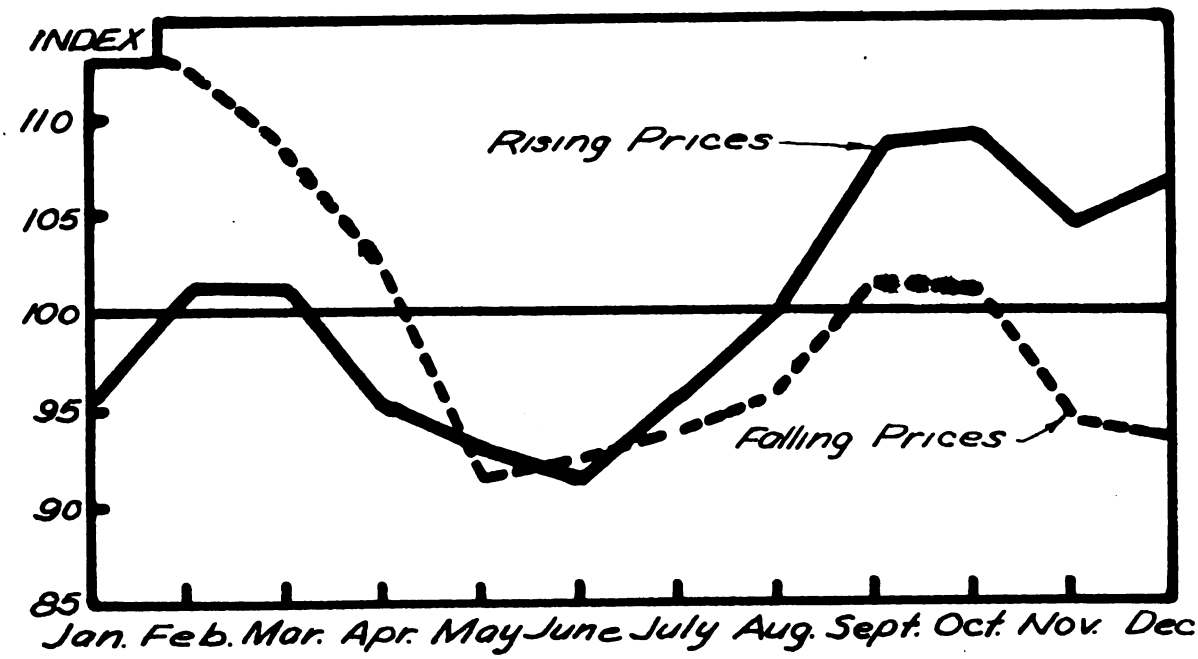


Figure 41. CALVES: Indexes of Average Seasonal Variation of Michigan Farm Prices for Six Years of Rising and Five Years of Falling Prices Selected from the Years 1923-1942.

MILK

Seasonal Pattern. Milk prices were lowest in June and reached a seasonal peak in November (Figure 42 and Table XIII). The average rise was about 16 percent, or 28 cents per hundredweight for the period 1933-1942. Milk production was highest in the months of May, June, and July, then declined through the fall and winter months, and rose again to

Table XIII - MILK: Average Seasonal Variation of Michigan Farm Prices and Index of Irregularity, 1933-1942.

Month	Average Seasonal Variation of Prices		
	Index	Price per hundredweight	Index of Irregularity
	(percent)	(dollars)	(percent)
January	104.3	1.88	6.1
February	103.0	1.85	5.6
March	99.4	1.79	4.3
April	97.0	1.75	5.2
May	93.6	1.68	3.4
June	91.4	1.65	5.1
July	94.4	1.70	5.1
August	98.1	1.77	5.9
September	101.3	1.82	4.8
October	103.8	1.87	3.0
November	107.2	1.93	2.9
December	106.5	1.92	6.2
Average	100.0	1.80	4.8

the spring and summer peak. The zone of irregularity was relatively narrow throughout the year indicating that prices were near the average seasonal pattern in the ten years of the 1930's.

Comparison 1910-1919 and 1933-1942. In the earlier decade, milk prices had a large amount of seasonality as

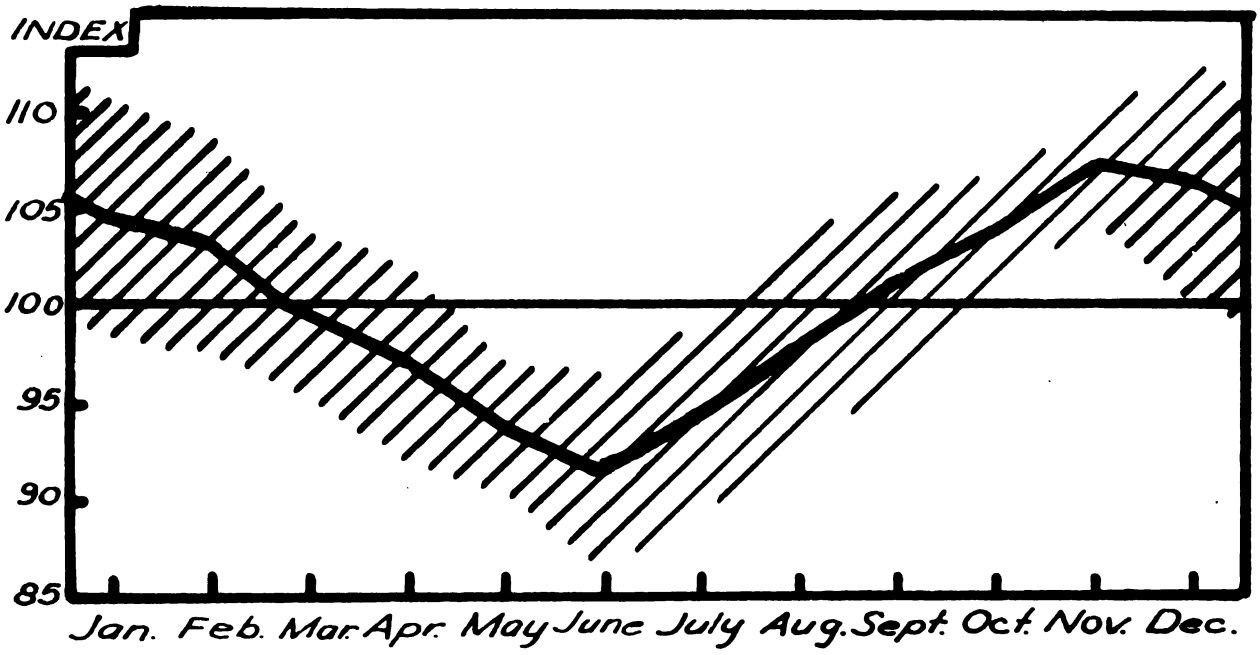


Figure 42. MILK: Index of Average Seasonal Variation of Michigan Farm Prices and Zone of Irregularity, 1933-1942.

compared with 1933-1942 (Figure 43). The high- and low-price months were about the same in both periods. From a low index of 75 in June, prices rose to a high of 117 in December in 1910-1919. Prices declined slowly for the next two months, then fell rapidly in the spring to the seasonal low in June.

Rising or Falling Prices. The seasonal pattern of milk prices differed with rising or falling prices (Figure 44). During periods of rising prices, milk prices declined from January to June then rose steadily to a seasonal high in December. When farm prices were falling, milk prices were lowest in June, rose to a minor peak in September then fell to December. The amount of variation with rising or falling prices was about 20 percent.

Summary and Conclusions. Milk prices followed a regular seasonal pattern in 1933-1942. With a tendency toward having more cows freshen in the fall months, better winter feeding practices, the base-surplus method of buying milk, and the like, the amount of seasonal variation in milk prices became smaller between 1910-1919 and 1933-1942. The average monthly movement of milk prices was the same under periods of rising or falling prices from January to September. After September, milk prices slumped when farm prices were falling but continued upward when farm prices were rising.

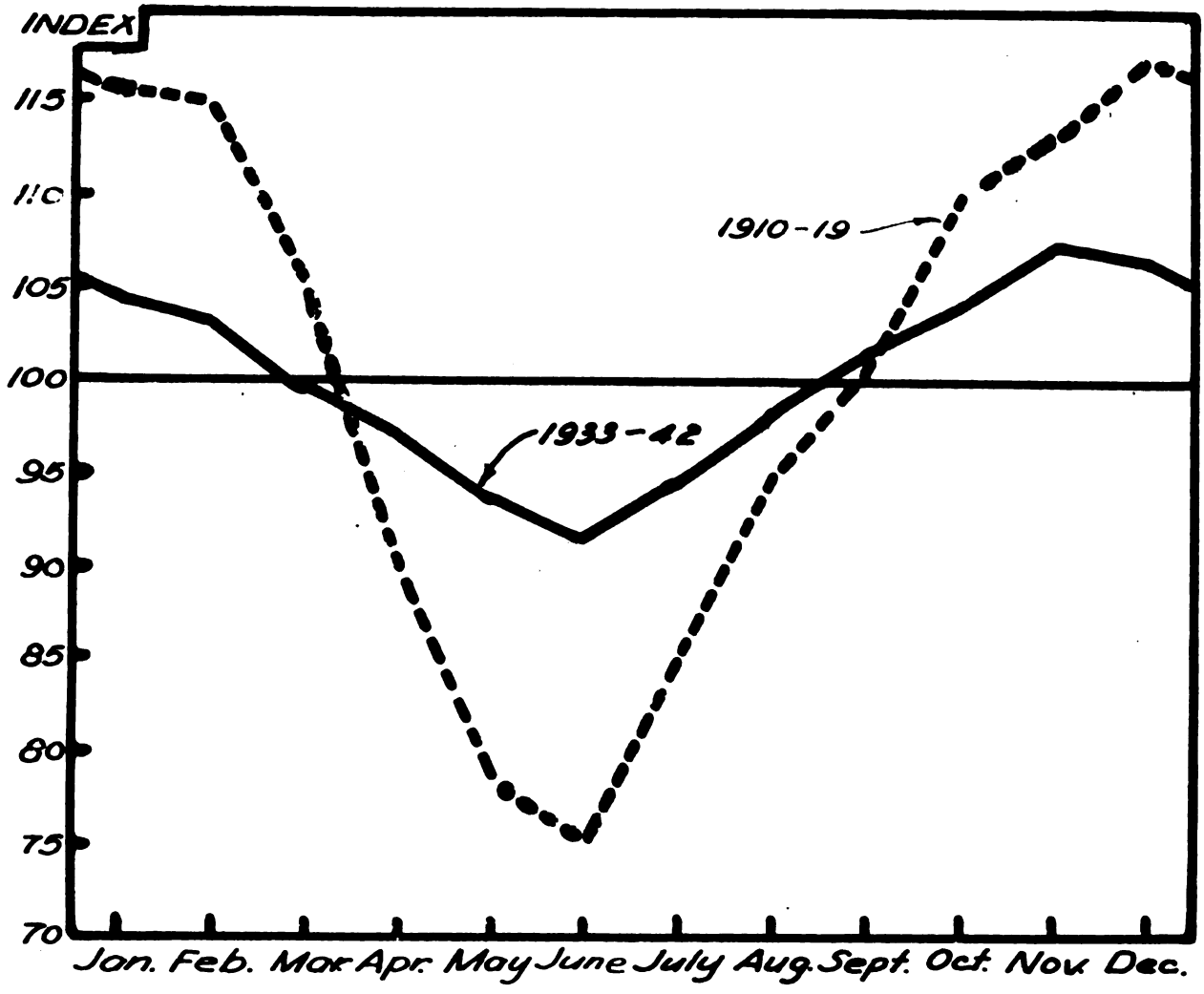


Figure 43. MILK: Indexes of Average Seasonal Variation of Michigan Farm Prices, 1910-1919 and 1933-1942.

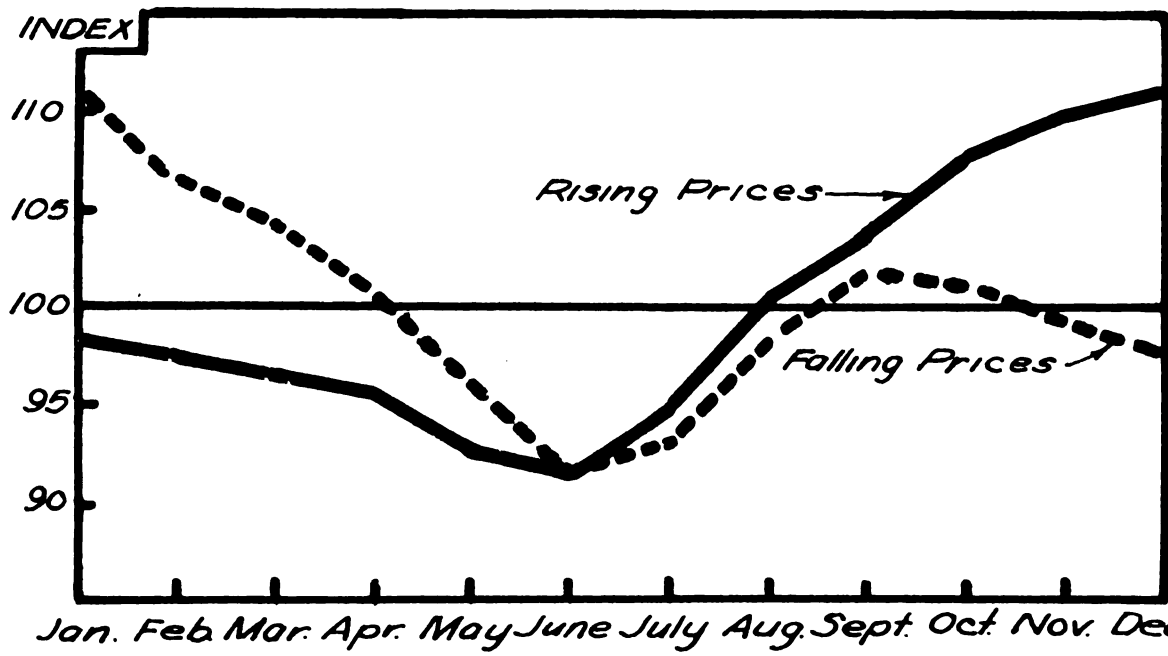


Figure 44. MILK: Indexes of Average Seasonal Variation of Michigan Farm Prices for Six Years of Rising Prices and Five Years of Falling Prices Selected from the Years 1923-1942.

BUTTER AND BUTTERFAT

Seasonal Pattern. Farm butter and butterfat prices followed similar seasonal patterns in 1933-1942 (Figures 45 and 46, and Tables XIV and XV). Prices of both were lowest in June and rose to seasonal peaks in December. The average price rise from June to December was 12 percent for butter and 13 percent for butterfat, or about 3 to 4 cents a pound. The zone of irregularity was generally greater for butterfat than butter. About one-third of the average annual

Table XIV - BUTTER: Average Seasonal Variation of Michigan Farm Prices and Index of Irregularity, 1933-1942.

Month	Average Seasonal Variation of Prices		
	Index	Price per pound	Index of Irregularity
	(percent)	(cents)	(percent)
January	103.4	32	8.5
February	104.2	32	11.2
March	100.2	31	8.1
April	98.6	30	9.2
May	97.2	30	5.9
June	94.0	29	5.9
July	97.1	30	9.1
August	96.6	30	7.0
September	98.5	30	6.9
October	100.5	31	6.2
November	104.2	32	5.0
December	105.5	32	8.3
Average	100.0	31	7.6

production of butter was manufactured by creameries in the months of May, June, and July--the months of heavy milk production.

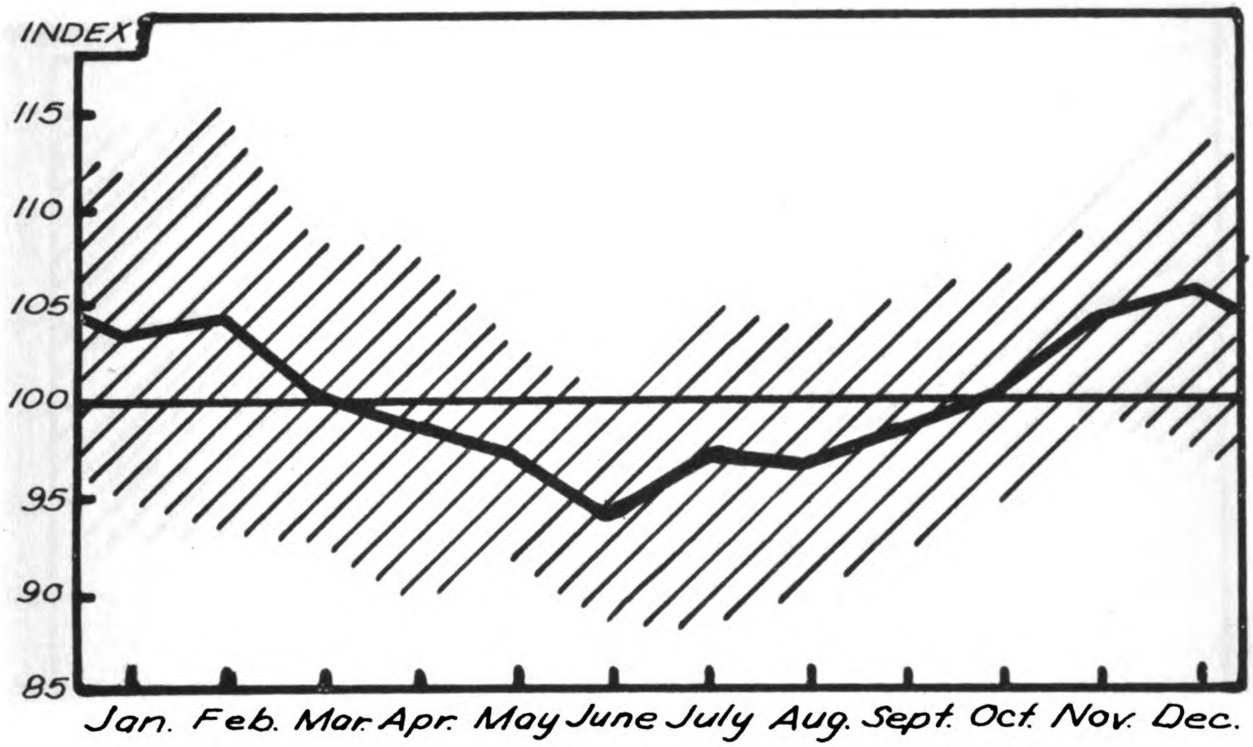


Figure 45. BUTTER: Index of Average Seasonal Variation of Michigan Farm Prices and Zone of Irregularity, 1933-1942.

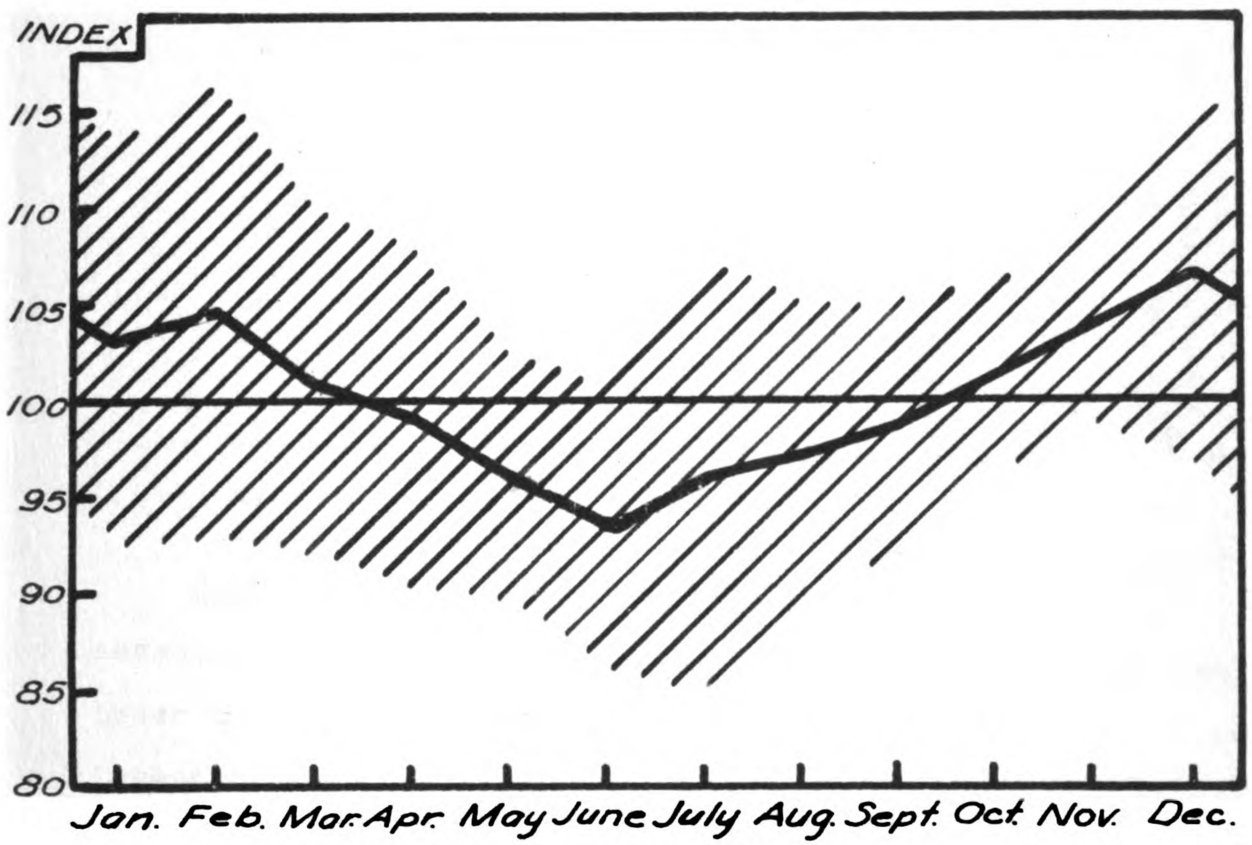


Figure 46. BUTTERFAT: Index of Average Seasonal Variation of Michigan Farm Prices and Zone of Irregularity, 1933-1942.

Table XV - BUTTERFAT: Average Seasonal Variation of Michigan Farm Prices and Index of Irregularity, 1933-1942.

Month	Average Seasonal Variation of Prices		
	Index	Price per pound	Index of Irregularity
	(percent)	(cents)	(percent)
January	103.2	31	10.7
February	104.6	32	12.1
March	100.9	30	9.1
April	99.1	30	9.1
May	96.0	29	6.6
June	93.3	28	7.7
July	96.0	29	11.6
August	97.1	29	7.9
September	98.6	30	6.6
October	101.2	31	5.2
November	103.8	31	5.2
December	106.2	32	9.8
Average	100.0	30	8.5

Comparison 1910-1919 and 1933-1942.[5/] The amount of seasonal variation in butter prices declined 12 percent between the two periods (Figure 47). Prices in 1910-1919 were lowest in July and highest in December, and the total variation between these two months was 24 percent.

Rising or Falling Prices. Both butter and butterfat were effected about the same by rising or falling farm prices (Figures 48 and 49). When farm prices were rising, butter and butterfat prices declined less than normal from January to June, then rose more than normal to December. Conversely, when farm prices were falling, butter and butterfat prices

5/ Butterfat prices 1910-1919 not included.

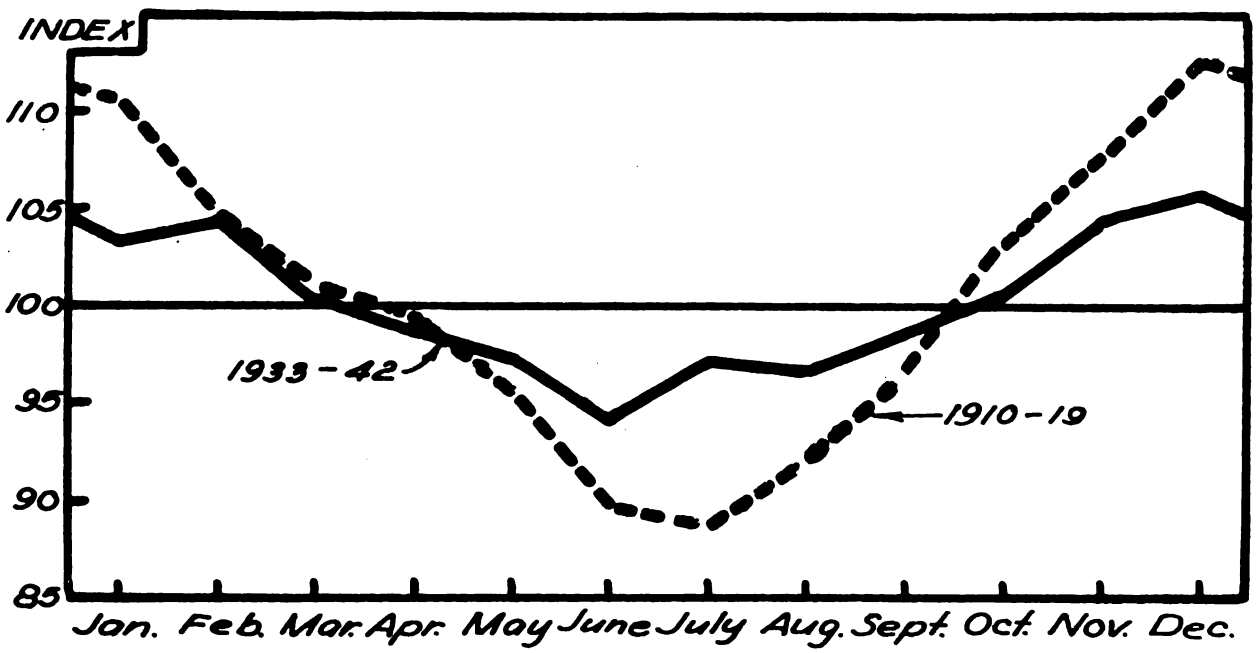


Figure 47. BUTTER: Indexes of Average Seasonal Variation of Michigan Farm Prices, 1910-1919 and 1933-1942.

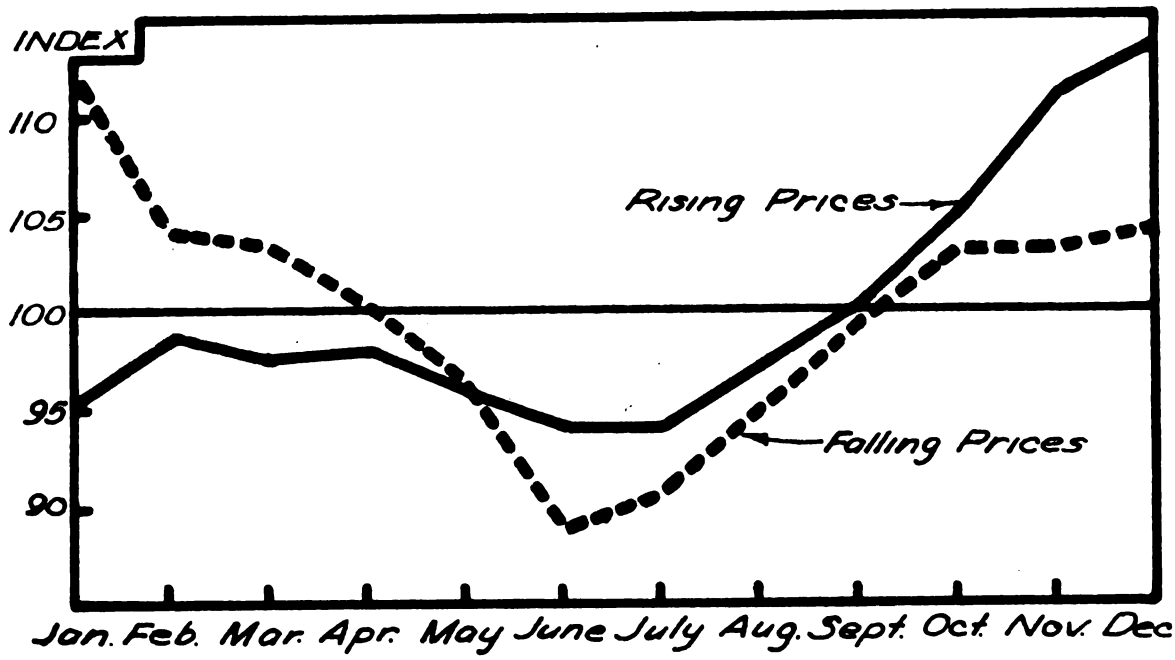


Figure 48. BUTTER: Indexes of Average Seasonal Variation of Michigan Farm Prices for Six Years of Rising Prices and Five Years of Falling Prices Selected from the Years 1923-1942.

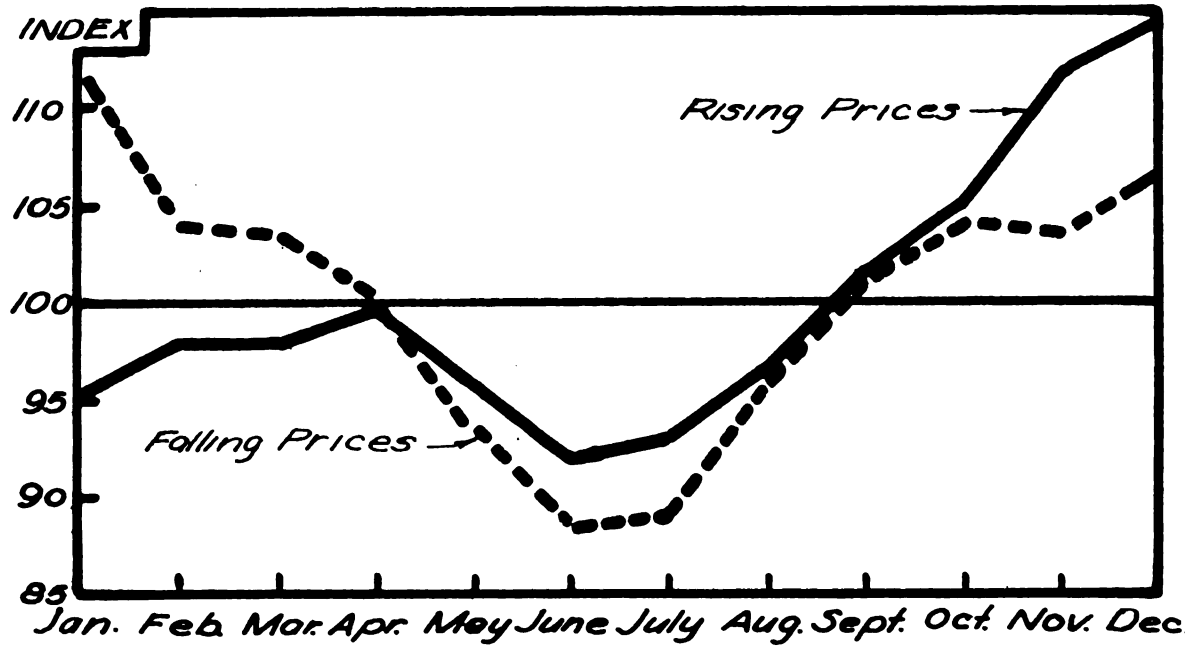


Figure 49. BUTTERFAT: Indexes of Average Seasonal Variation of Michigan Farm Prices for Six Years of Rising Prices and Five Years of Falling Prices Selected from the Years 1923-1942.

declined more than normal for the first six months of the year and rose less than normal the last six months, and the total variation from January to June was 24 percent for both products.

Summary and Conclusions. Butter and butterfat prices were lowest in the months of high milk production and highest in the months of low milk production in 1933-1942. Butter prices showed less seasonal change in 1933-1942 than in 1910-1919, but the shift was less pronounced than it was for milk prices. Butter is manufactured during the months of highest milk production and is moved into storage. Storage stocks are then consumed during the months of low milk production. The fact that butter can be stored evens out the seasonal price variation as compared with the seasonal variation of the price of milk. Prices of butterfat fell gradually from January to June then rose rapidly following June when prices were rising. The drop and recovery in butter and butterfat prices was sharp in each six-month period when farm prices were falling.

SHEEP

Seasonal Pattern. Sheep prices rose from November to a seasonal peak in March (Figure 50 and Table XVI). The drop in price from March to July was pronounced. The decline in price during the spring months resulted from heavy marketings, and the fact that most of the sheep were shorn before

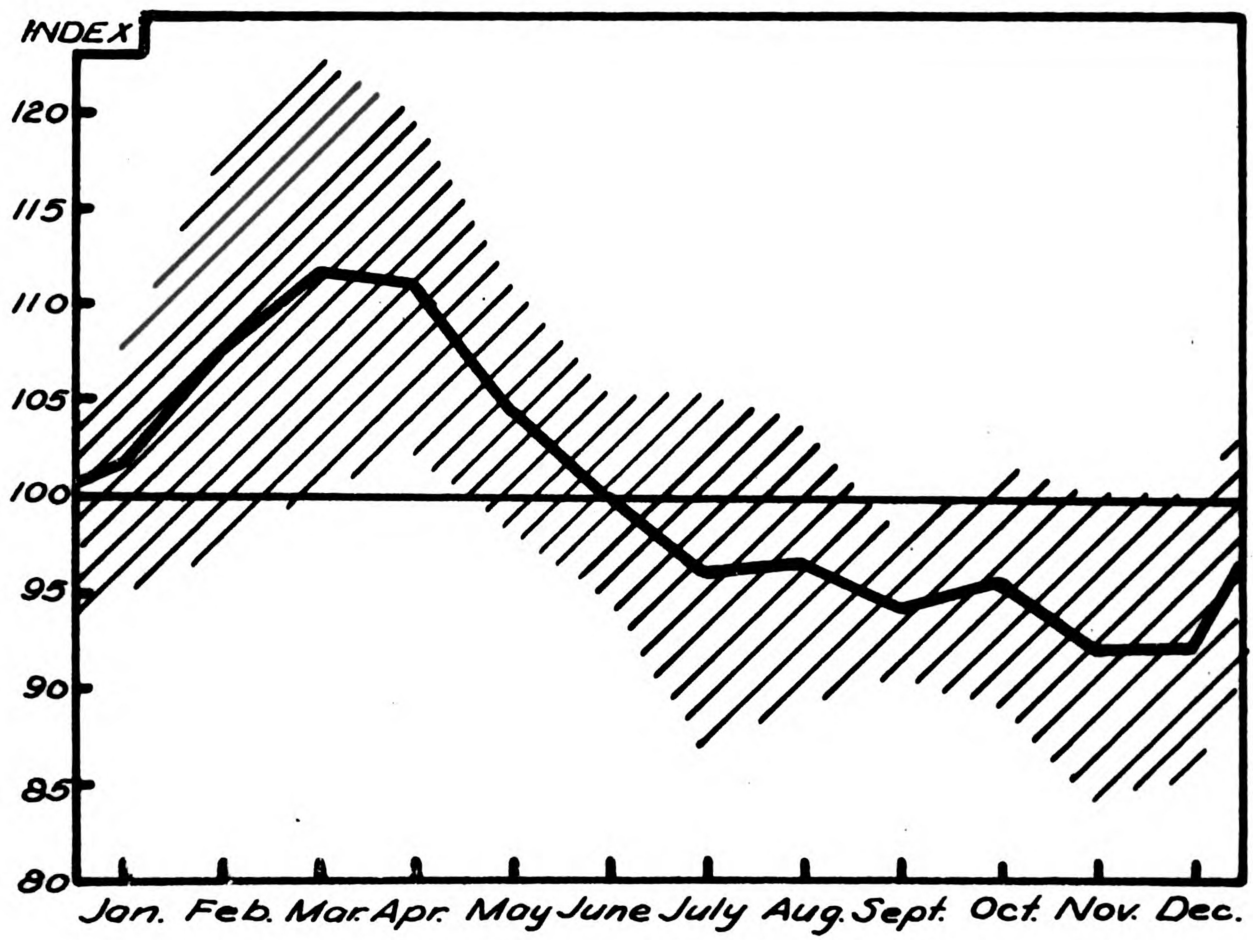


Figure 50. SHEEP: Index of Average Seasonal Variation of Michigan Farm Prices and Zone of Irregularity, 1933-1942.

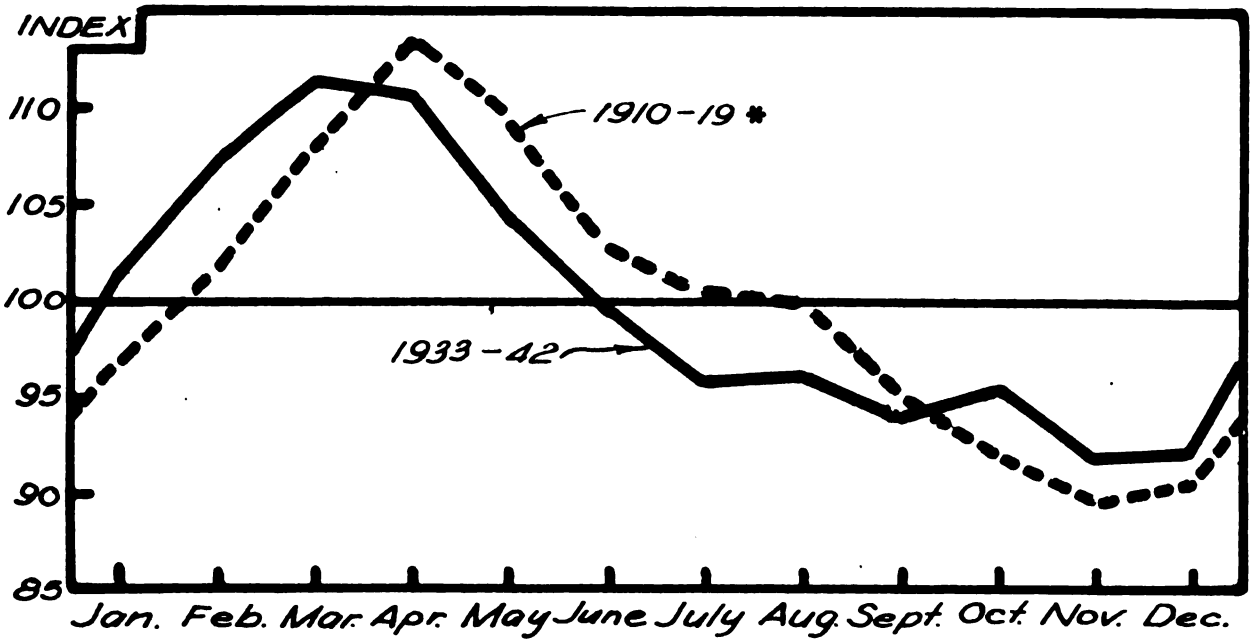
being sent to market. Sheep prices tended to be more irregular during the highest-price months as indicated by the shaded area in Figure 50.

Table XVI - SHEEP: Average Seasonal Variation of Michigan Farm Prices and Index of Irregularity, 1933-1942.

Month	Average Seasonal Variation of Prices		
	Index	Price per hundredweight	Index of Irregularity
	(percent)	(dollars)	(percent)
January	101.4	3.55	6.9
February	107.2	3.75	10.6
March	111.4	3.90	11.3
April	110.8	3.88	9.0
May	104.3	3.65	6.4
June	99.7	3.49	5.5
July	95.8	3.35	9.4
August	96.2	3.37	7.5
September	94.0	3.29	3.7
October	95.3	3.34	6.4
November	91.8	3.21	8.1
December	92.1	3.22	7.2
Average	100.0	3.50	7.7

Comparison 1910-1919 and 1933-1942. The spring peak in sheep prices occurred one month earlier in the more recent period than in the earlier decade (Figure 51). The amount of seasonal variation declined about 4 percent between the two periods. In 1910-1919 sheep prices declined more steadily throughout the summer and fall months than they did in 1933-1942.

Rising or Falling Prices. The magnitude of variation of sheep prices was 16 percent greater when farm prices were



*January to June 1910 not included.

Figure 51. SHEEP: Indexes of Average Seasonal Variation of Michigan Farm Prices, 1910-1919 and 1933-1942.

falling than when farm prices were rising (Figure 52). When all farm prices were falling sheep prices climbed steadily from January to March then dropped sharply to a seasonal low in November. During periods of rising prices, sheep prices followed about the usual seasonal pattern until July. After July, the price of sheep rose irregularly to December.

Summary and Conclusions. Sheep prices tended to rise from November to March and then decline. In 1910-1919, sheep prices lagged about one month behind the 1933-1942 pattern until September. After September prices in the earlier period continued steadily downward to the seasonal low in November. A greater premium was placed on earlier marketing of sheep when all farm prices were falling than when they were rising.

LAMBS

Seasonal Pattern. Lamb prices varied less than 5 percent from the average annual price in 1933-1942 (Figure 53 and Table XVII). From a seasonal high in March, prices fell unevenly to a seasonal low in November. About three-fifths of the sheep and lambs in Michigan were marketed in the five months, October through February. In spite of the heavy marketings in these months, the seasonal variation in price was not great. Western lambs bought in the months of heavy

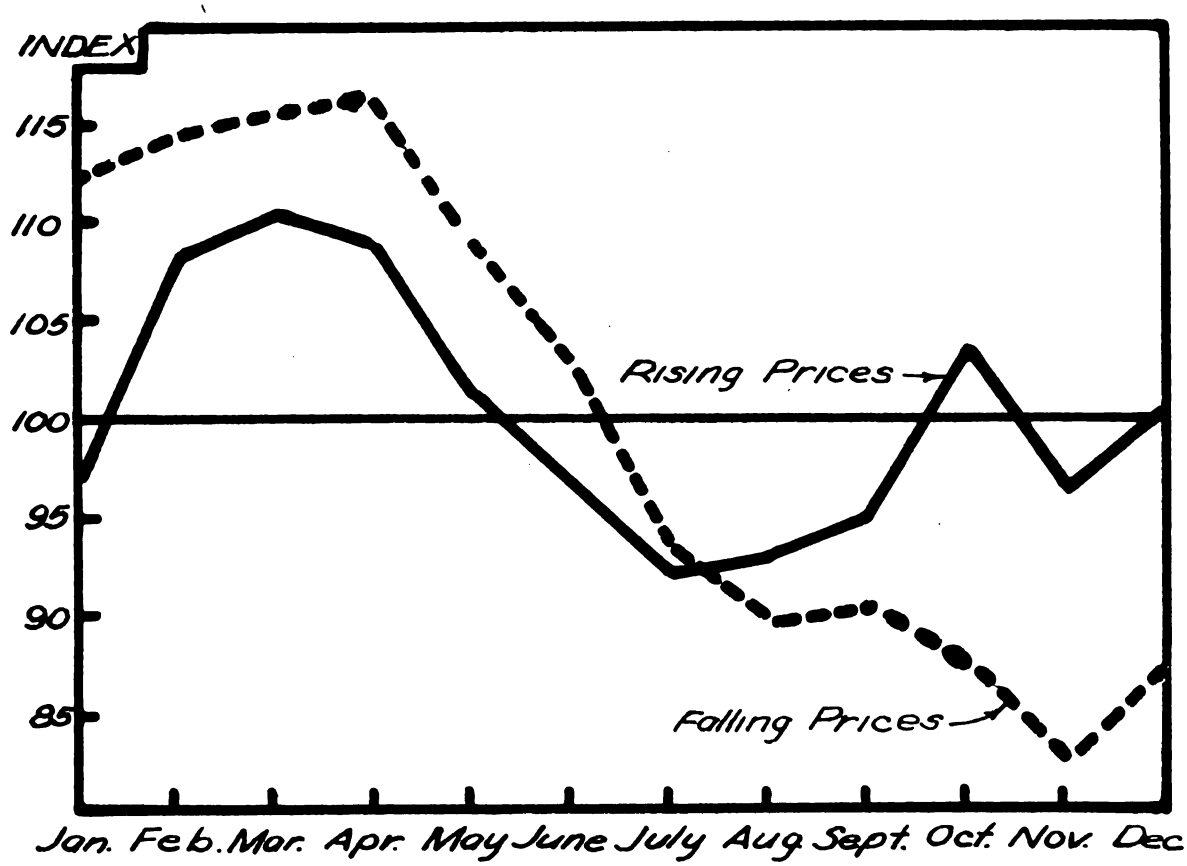


Figure 52. SHEEP: Indexes of Average Seasonal Variation of Michigan Farm Prices for Six Years of Rising Prices and Five Years of Falling Prices Selected from the Years 1923-1942.

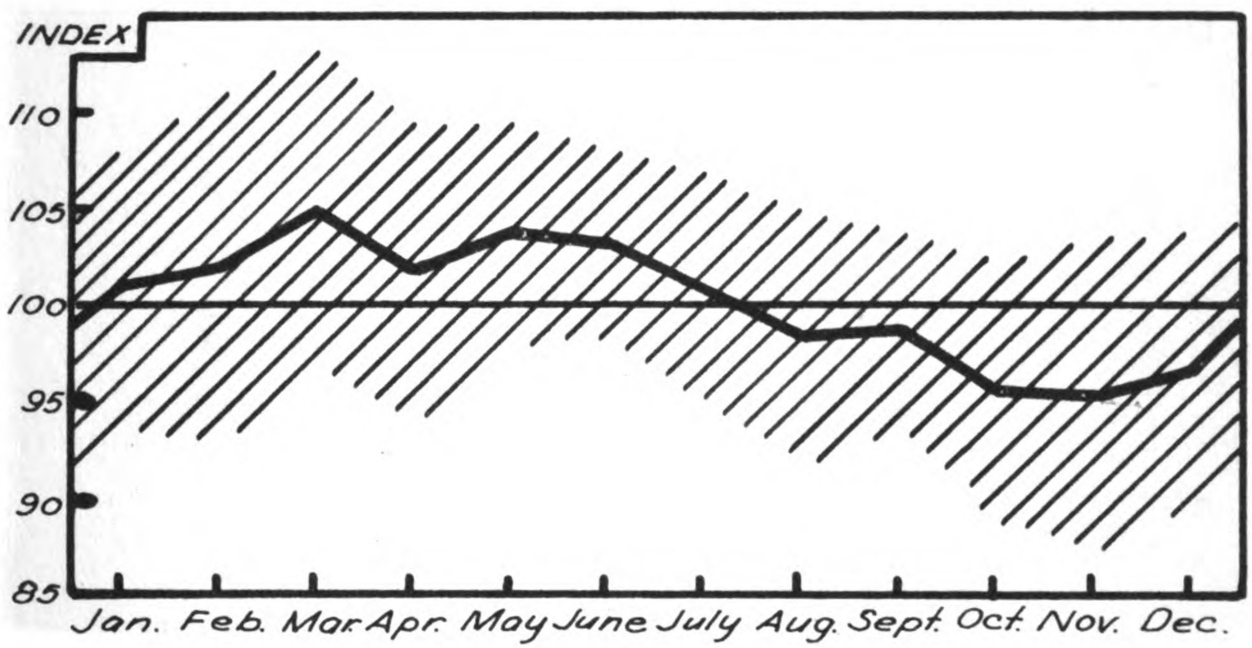


Figure 55. LAMBS: Index of Average Seasonal Variation of Michigan Farm Prices and Zone of Irregularity, 1933-1942.

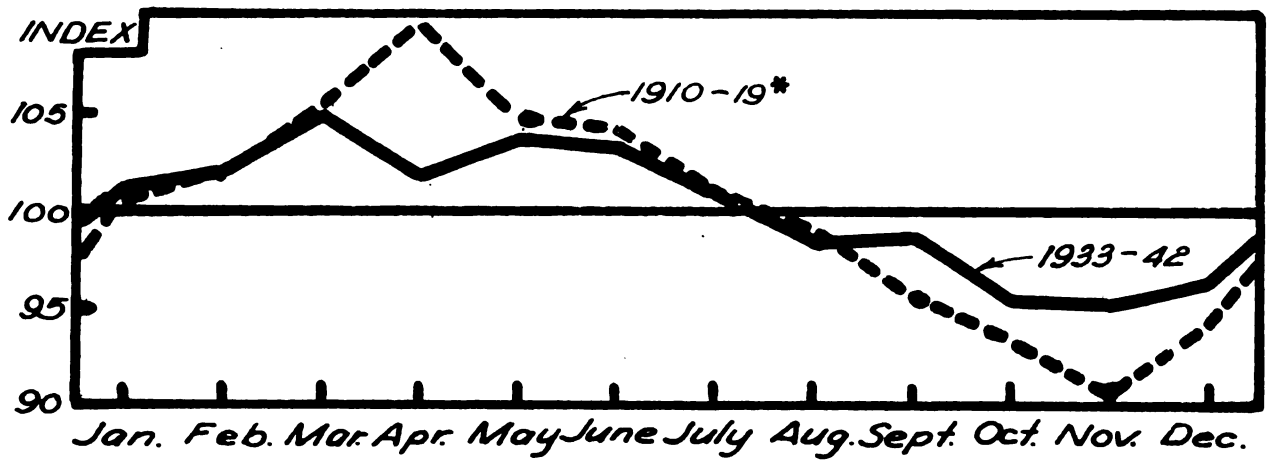
marketings and moved into feed lots were finished and sent to market during the five-month period--January to May.

Table XVII - LAMBS: Average Seasonal Variation of Michigan Farm Prices and Index of Irregularity, 1933-1942.

Month	Average Seasonal Variation of Prices		
	Index	Price per hundredweight	Index of Irregularity
	(percent)	(dollars)	(percent)
January	100.9	10.02	7.6
February	101.8	10.11	9.2
March	104.8	10.41	8.5
April	101.6	10.09	8.0
May	103.5	10.28	6.0
June	103.0	10.23	5.1
July	100.7	10.00	6.1
August	98.2	9.75	6.7
September	98.5	9.78	5.3
October	95.3	9.46	7.0
November	95.2	9.45	8.3
December	96.5	9.58	7.2
Average	100.0	9.93	7.1

This provided a fairly even seasonal flow of slaughter lambs to market and kept the price from advancing more in the spring and early summer months. The zone of irregularity was relatively wide indicating considerable variability in the price of lambs from year to year.

Comparison 1910-1919 and 1933-1942. The amount of seasonal variation was about half as great in 1933-1942 as in the earlier decade (Figure 54). In 1910-1919, lamb prices fell steadily from an index of 110 in April to 91 in November, then rose evenly to the April peak. The seasonal peak came a month earlier in the later decade.



*January to June 1910 not included.

Figure 54. LAMBS: Indexes of Average Seasonal Variation of Michigan Farm Prices, 1910-1919 and 1933-1942.

Rising or Falling Prices. During periods of declining farm prices, lamb prices fell irregularly from January through December (Figure 55). The average drop in lamb prices was about 24 percent or 2 dollars per hundredweight. On the other hand, when farm prices were rising, lamb prices fluctuated about 4 percent above and below the average annual price throughout the year.

Summary and Conclusions. Lamb prices were highest in the spring and summer, and tended to be lowest in the fall and winter months in 1933-1942. The seasonal variation of lamb prices was considerably less in 1933-1942 than in 1910-1919. During periods of falling farm prices, there was a greater advantage in earlier marketing than when farm prices were rising.

WOOL

Seasonal Pattern. Wool prices were lowest in the early spring months and highest in June (Figure 56 and Table XVIII). The price rise from April to June was about 10 percent or 3 cents a pound. Following June, prices fluctuated above the average annual price until January before dropping to the seasonal low in March and April. About 85 percent of the wool in Michigan was marketed in the four months, April, May, June, and July. The shaded area in Figure 56 indicates that the price was more variable in the months of heaviest marketings.

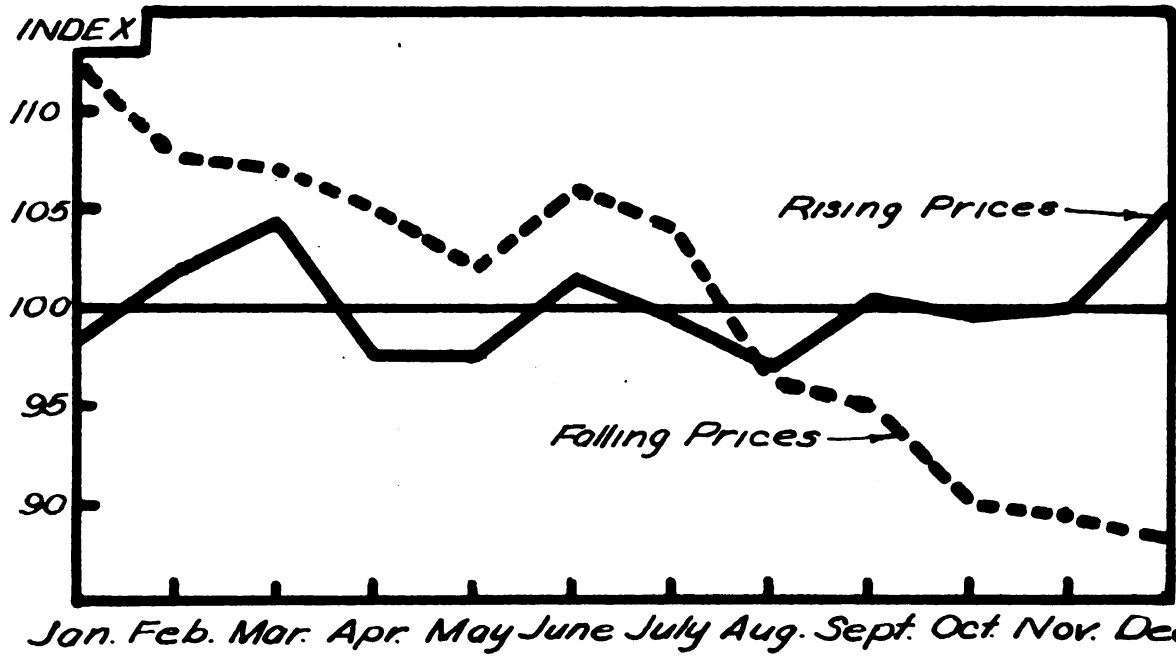


Figure 55. LAMBS: Indexes of Average Seasonal Variation of Michigan Farm Prices for Six Years of Rising Prices and Five Years of Falling Prices Selected from the Years 1923-1942.

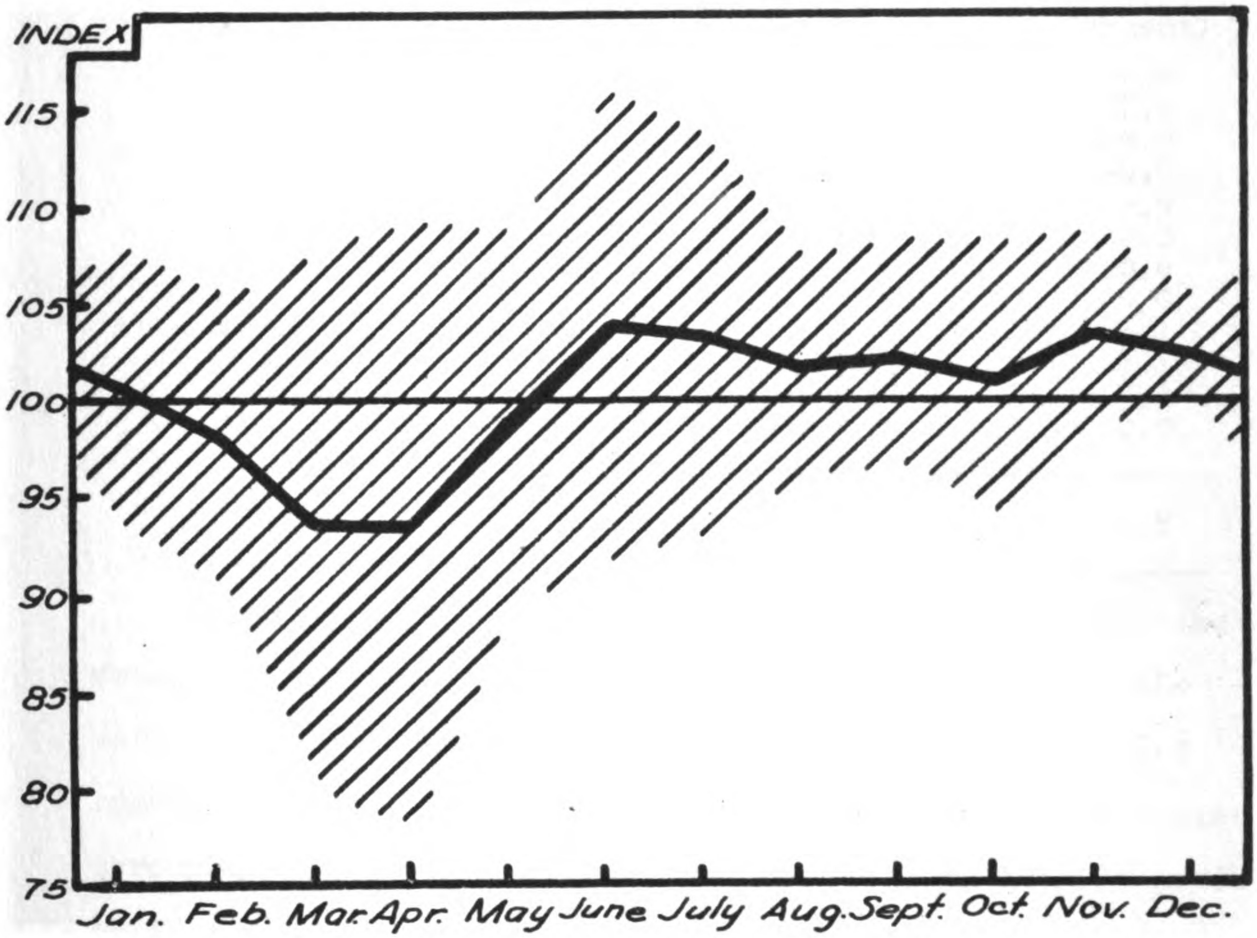


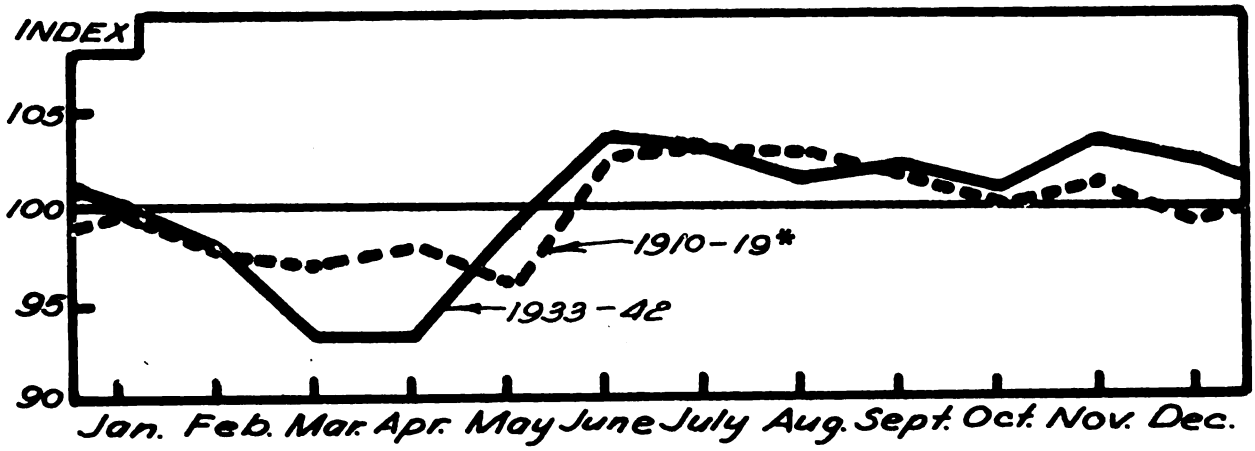
Figure 56. WOOL: Index of Average Seasonal Variation of Michigan Farm Prices and Zone of Irregularity, 1933-1942.

Table XVIII - WOOL: Average Seasonal Variation of Michigan Farm Prices and Index of Irregularity, 1933-1942.

Month	Average Seasonal Variation of Prices		
	Index	Price per pound	Index of Irregularity
	(percent)	(cents)	(percent)
January	100.4	29	7.4
February	97.9	28	7.9
March	93.3	27	14.4
April	93.3	27	16.0
May	98.8	29	9.9
June	103.5	30	12.3
July	103.0	30	10.6
August	101.5	30	6.0
September	102.0	30	6.1
October	100.8	29	7.1
November	103.3	30	5.4
December	102.2	30	2.9
Average	100.0	29	8.8

Comparison 1910-1919 and 1933-1942. In 1933-1942, the seasonal variation of wool prices was greater than in the earlier period (Figure 57). Prices in the earlier period remained within 1 cent per pound of the average annual price throughout the year. Between the two periods, the low-price month shifted from May to the months of March and April

Rising or Falling Prices. Wool prices were highly sensitive to price level movements (Figure 58). During periods of falling prices, wool prices were highest in January and dropped 39 percent to a seasonal low in June before recovering gradually to December. When farm prices were rising, wool prices fluctuated within 2 percent of the average annual price throughout the year.



*January to June 1910 not included.

Figure 57. WOOL: Indexes of Average Seasonal Variation of Michigan Farm Prices, 1910-1919 and 1933-1942.

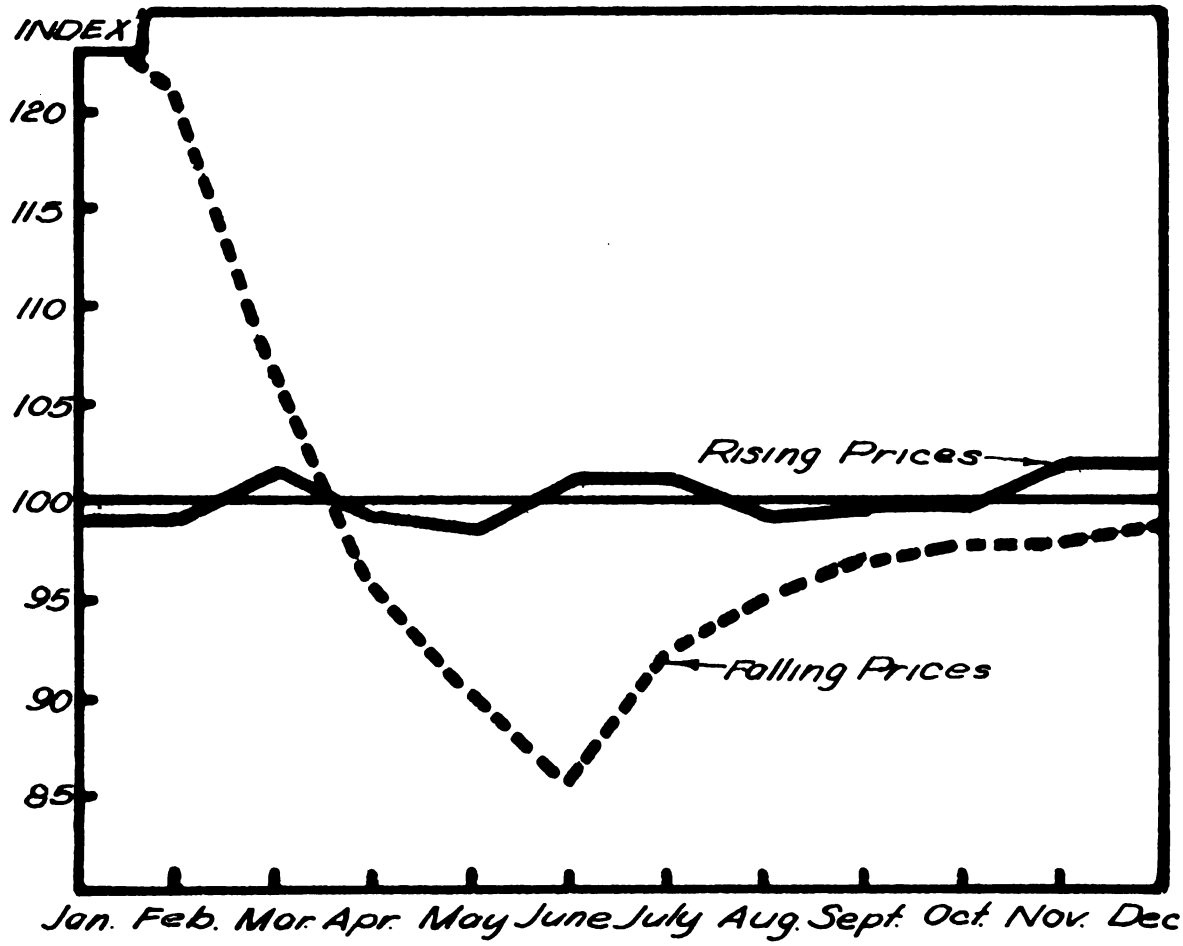


Figure 58. WOOL: Indexes of Average Seasonal Variation of Michigan Farm Prices for Six Years of Rising Prices and Five Years of Falling Prices Selected from the Years 1923-1942.

Summary and Conclusions. Wool prices had a small amount of seasonal variation in 1933-1942, but the total amount of variation was greater than in 1910-1919. Since the amount of variation was small, the time of marketing was of little importance except during periods of falling prices. When farm prices were falling, earlier shearing, or longer storage, was advantageous to avoid the low prices in the late spring and early summer months.

CHICKENS

Seasonal Pattern. Chicken prices reached a seasonal peak in April and were lowest in December (Figure 59 and

Table XIX - CHICKENS: Average Seasonal Variation of Michigan Farm Prices and Index of Irregularity, 1933-1942.

Month	Average Seasonal Variation of Prices		
	Index	Price per pound	Index of Irregularity
	(percent)	(cents)	(percent)
January	97.7	17	6.2
February	100.5	18	5.5
March	104.0	18	6.1
April	108.4	19	6.6
May	107.1	19	6.3
June	100.1	18	3.8
July	101.0	18	6.3
August	98.8	18	6.6
September	101.7	18	4.8
October	96.2	17	4.8
November	92.6	16	3.3
December	91.9	16	7.7
Average	100.0	18	5.7

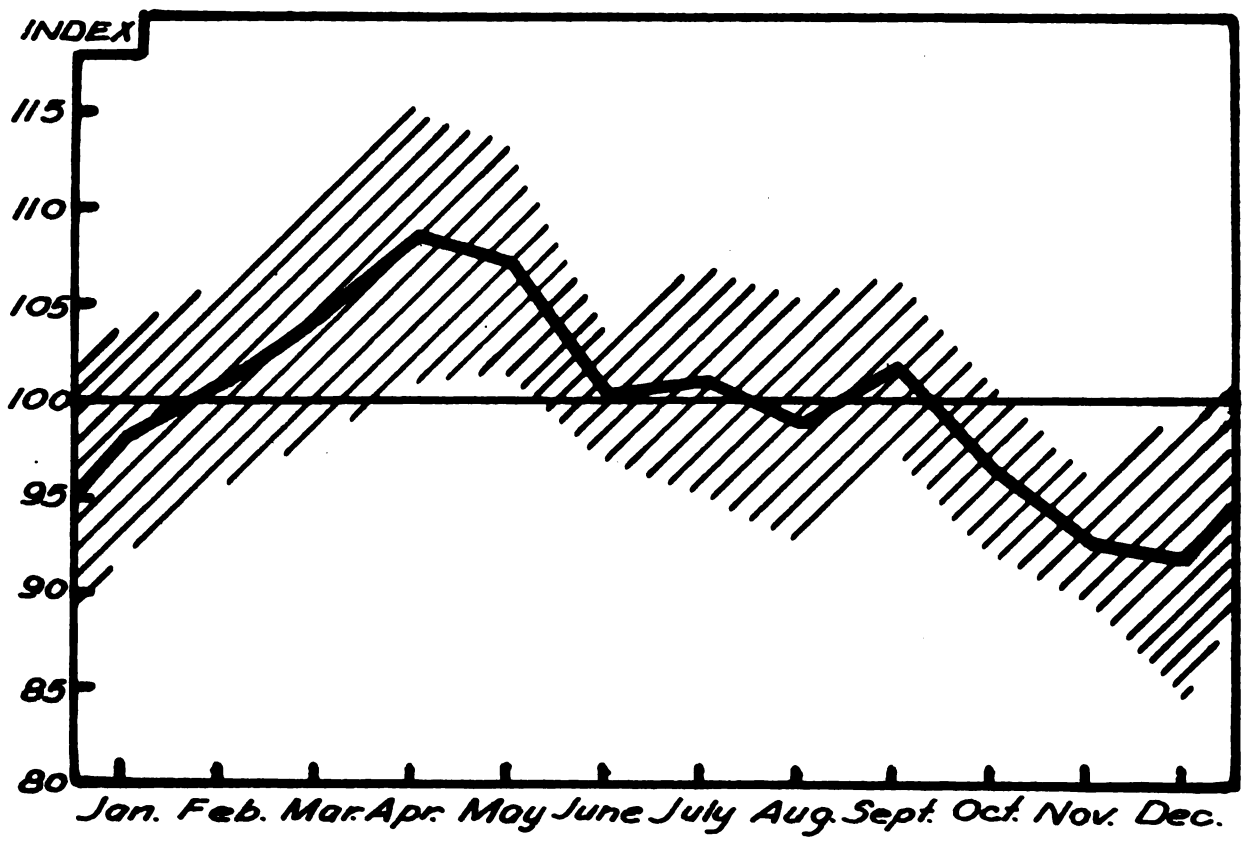


Figure 59. POULTRY: Index of Average Seasonal Variation of Michigan Farm Prices and Zone of Irregularity, 1933-1942.

Table XIX).[6] The spread between the high and low months was about 18 percent or 3 cents a pound. After dropping from April to June, chicken prices fluctuated around the average annual level until September, then dropped to a seasonal low in December. Prices steadily rose from December until April. Almost 80 percent of the chickens were marketed in the last six months of the year--the months of lowest prices. The zone of irregularity was narrowest in June and during the fall months.

Comparison 1910-1919 and 1933-1942. Chicken prices in the earlier period were relatively high throughout the spring and summer months, then dropped sharply from September to December (Figure 60). The months of peak and low prices were the same in both periods, but the amount of variation was about 3 percent greater in the earlier decade,

Rising or Falling Prices. When farm prices were falling, chicken prices were more favorable earlier in the year (Figure 61). Again, prices were highest in April and lowest in December. From April to June prices dropped sharply, then levelled off until August before falling to the seasonal low in December. During periods of rising farm prices, chicken prices rose from January to April, then fluctuated above the average annual level until October. Prices during the remainder of the year were slightly below the average annual level.

Summary and Conclusions. Four-fifths of the chickens were marketed in the lower-price months from July to December.

6/ The Michigan farm price of chickens includes hens, broilers, springers, and friers. Each of these have different seasonal price patterns and this is a composit of all chicken prices.

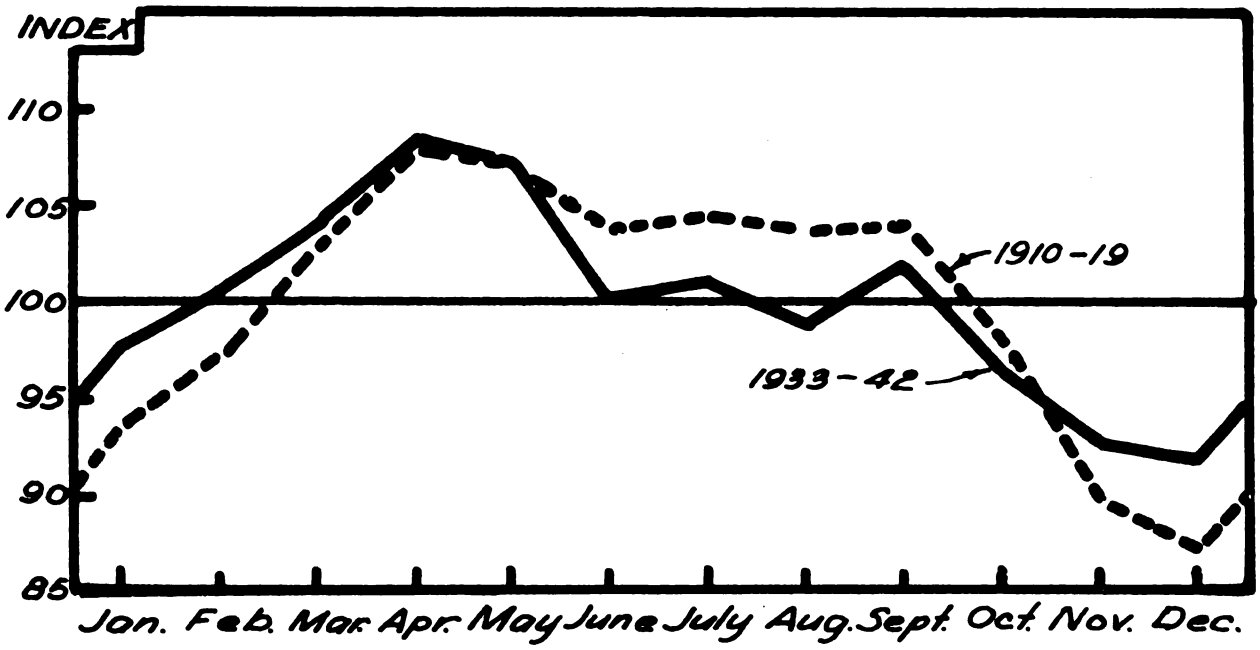


Figure 60. POULTRY: Indexes of Average Seasonal Variation of Michigan Farm Prices, 1910-1919 and 1933-1942.

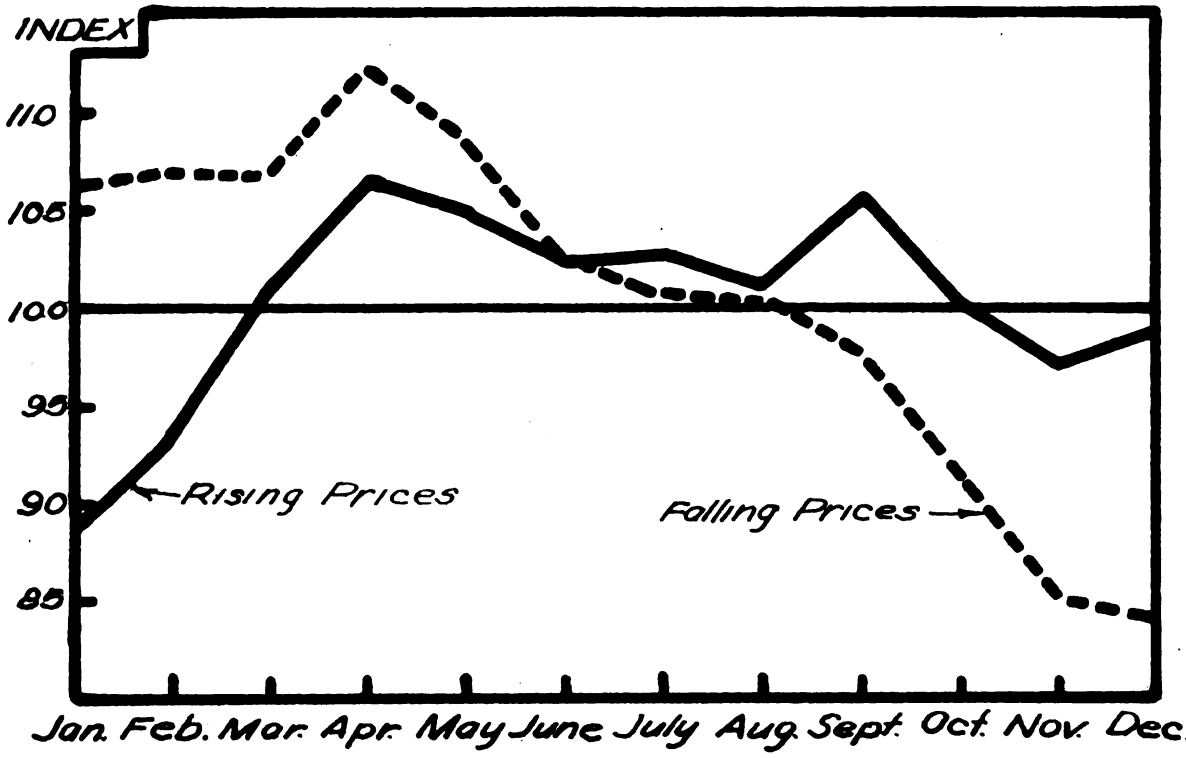


Figure 61. POULTRY: Indexes of Average Seasonal Variation of Michigan Farm Prices for Six Years of Rising Prices and Five Years of Falling Prices Selected from the Years 1923-1942.

The seasonal pattern became less pronounced between 1910-1919 and 1933-1942 even though the high- and low-price months remained the same. During periods of rising prices, chicken prices were more favorable during the months of heavy marketings than they were during periods of falling prices.

EGGS

Seasonal Pattern. From a low in June, egg prices rose 65 percent to an index of 143 in November (Figure 62 and Table XX). This rise represented an increase of 11 cents a dozen for the five-month period. Egg production was highest in the months of March, April, May and June, and

Table XX - EGGS: Average Seasonal Variation of Michigan Farm Prices and Index of Irregularity, 1933-1942.

Month	Average Seasonal Variation of Prices		
	Index	Price per dozen	Index of Irregularity
	(percent)	(cents)	(percent)
January	103.0	23	11.9
February	91.6	20	16.0
March	80.9	18	6.8
April	79.5	18	8.1
May	79.4	18	7.0
June	77.8	17	9.3
July	88.3	20	7.8
August	96.3	21	6.2
September	108.8	24	7.1
October	125.9	28	7.3
November	143.0	32	11.5
December	125.5	28	11.2
Average	100.0	22	9.2

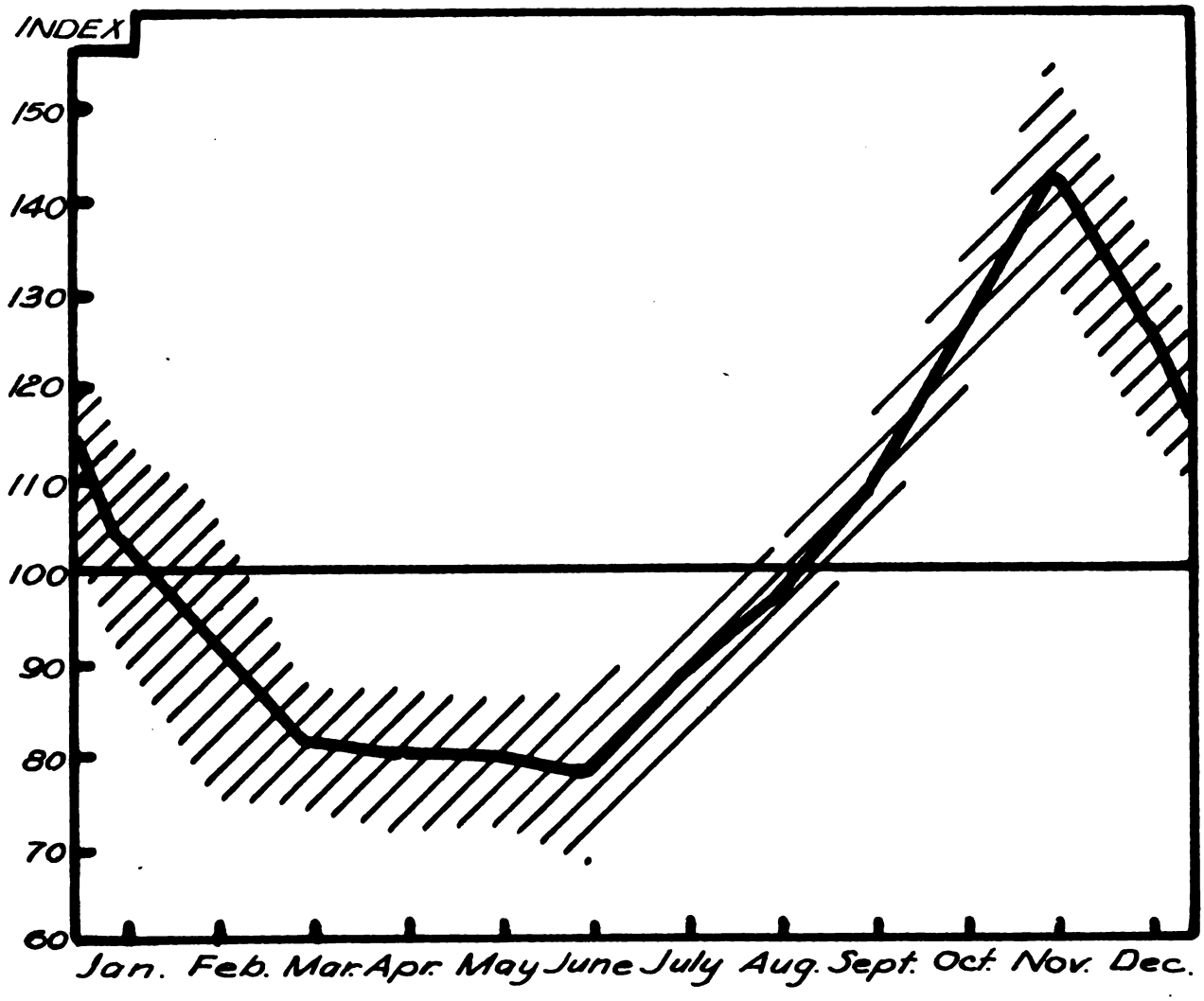


Figure 62. EGGS: Index of Average Seasonal Variation of Michigan Farm Prices and Zone of Irregularity, 1933-1942.

lowest in November. In general, egg prices were highest during the months of low production and lowest during the months of high production. The zone of irregularity was relatively narrow indicating that prices tended to follow the average seasonal pattern closely in all years.

Comparison 1910-1919 and 1933-1942. The seasonal variation of egg prices was greater in 1933-1942 than in the earlier period (Figure 63). Egg prices varied about 52 percent between the high and low months in 1910-1919. The most significant shift was that the seasonal peak was reached in December instead of a month earlier as was true in the later decade.

Rising or Falling Prices. Whether or not farm prices were rising or falling had little effect on the seasonal variation of egg prices (Figure 64). In either case, prices were lowest in the spring and summer months and highest in November. The magnitude of variation was about 66 percent in both periods about the same as it was in the period 1933-1942.

Summary and Conclusions. Egg prices had a large amount of seasonality and followed a regular pattern in all years. Between 1910-1919 and 1933-1942, egg prices became more variable, and the highest price month shifted from December to November. About one-half of the eggs was produced in the four months March through June. Eggs normally move into storage during these months and are consumed during the months of low production. Apparently, the improved storage facilities during

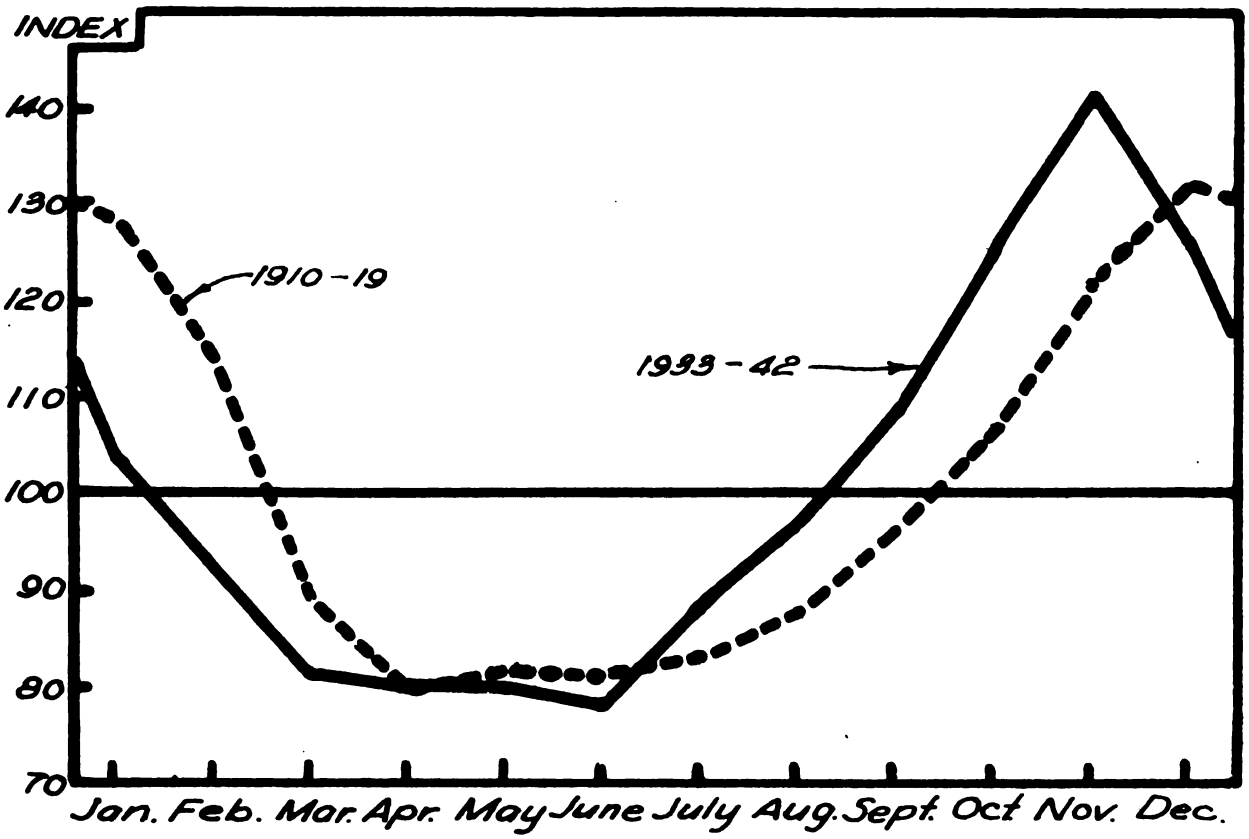


Figure 63. EGGS: Indexes of Average Seasonal Variation of Michigan Farm Prices, 1910-1919 and 1933-1942.

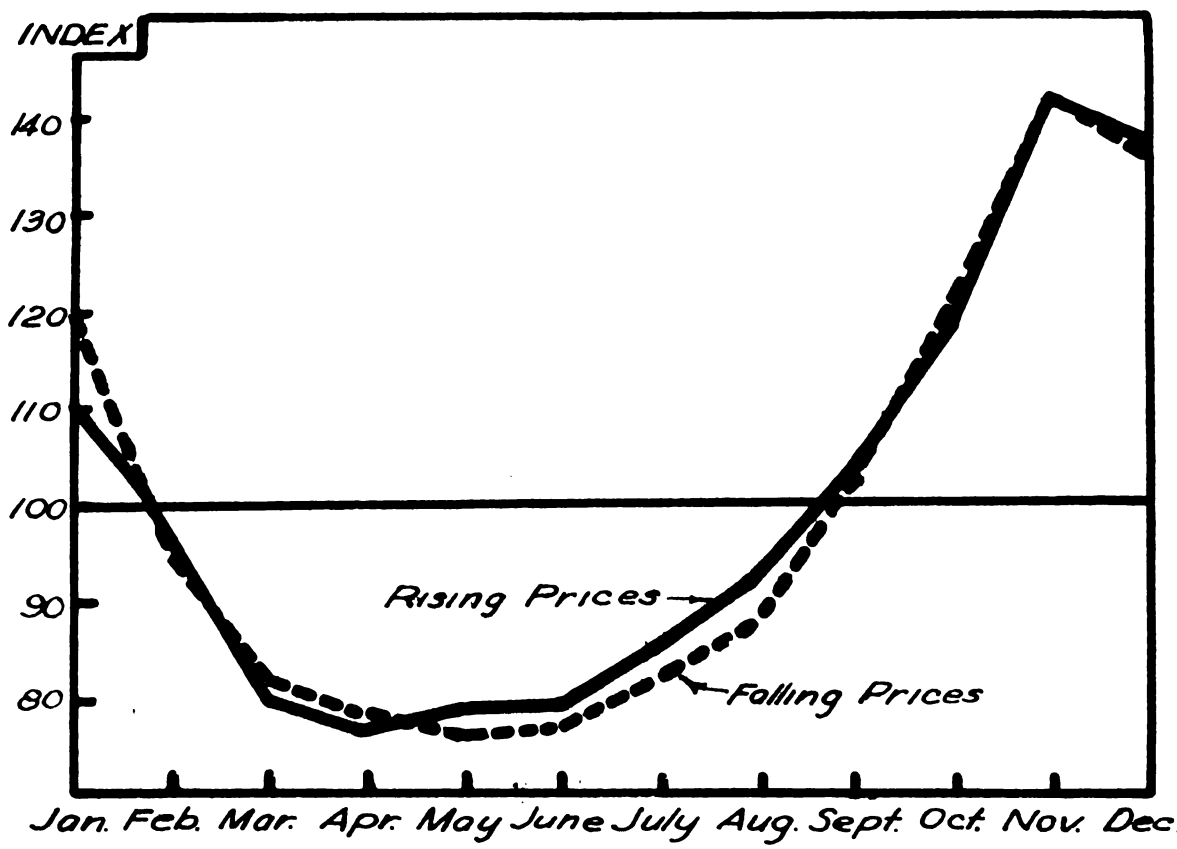


Figure 64. EGGS: Indexes of Average Seasonal Variation of Michigan Farm Prices for Six Years of Rising Prices and Five Years of Falling Prices Selected from the Years 1923-1942.

the more recent years had little effect on the seasonality of fresh egg prices. The seasonal pattern of egg prices was almost unaffected by rising or falling farm prices.

BIBLIOGRAPHY

Anonymous
May, 1927 — Prices of Farm Products Received by Producers in the North Central States, U.S.D.A. Statistical Bulletin 15.

Anonymous
December, 1946 — Agricultural Outlook Charts 1947, U.S.D.A., B.A.E.

Anonymous
1925 through 1947 — Crop Report of Michigan, Annual Crop and Livestock Summary, Michigan Department of Agriculture Cooperating with the U.S.D.A.

Buchanan, M. T.
September, 1944 — Seasonal Variation in Prices of Washington Farm Products, State College of Washington, Agricultural Experiment Station Bulletin 452.

Butz, E. L.
May, 1942 — Seasonal Variation of Indiana Farm Prices, Purdue University Agricultural Experiment Station Bulletin 469.

Norton, L. J.
July, 1941 — When Should Grain Be Marketed, University of Illinois Extension Circular 516.

Waugh, A. E.
1943 — Elements of Statistical Method, McGraw-Hill Book Company, Inc.

Ulrey, Orion
June, 1934 — Michigan Farm Prices and Costs 1910-1934, Michigan State College Agricultural Experiment Station, Technical Bulletin 139.

APPENDIX A

Illustration of Method Used in the Computation Of The Index of Average Seasonal Variation

ILLUSTRATION OF METHOD USED IN THE COMPUTATION OF THE INDEX OF AVERAGE SEASONAL VARIATION

The 12-Month Moving Total. The method used in computing the index of average seasonal variation of Michigan farm prices was the 12-month moving total with each monthly price expressed as a percent of this trend. This procedure gives an adjusted index and is illustrated in Table XXI. The mid-month farm price of corn appears in the first column under each year. These prices were totaled for one year, centered on the seventh month, and entered in column two under each year. Thus the $3.90 that appears opposite January in the second column under 1933 represents the total of the monthly prices from July 1932 through June 1933. The February 1933 moving total figure of $4.16 represents the total of the monthly prices from August 1932 through July 1933. Other figures in the moving total columns were calculated in the same manner. Trend and price cycles, other than a 12-month cycle, appear in the 12-month moving total. By eliminating the trend and cycles, only the seasonal variation remains. This was done by expressing each monthly price as a percent of the 12-month moving total. These figures appear in the third column under each year in Table XXI and were used as a basis for computing the index of average seasonal variation for the period.

Table XXI - CORN: Michigan Monthly Prices, Moving Totals, and Percents of Moving Totals, 1933-1942.

Month	1932			1933			1934			1935		
	Price per bu.	12 Mo. Moving Total	Price as Percent of Moving Total	Price per bu.	12 Mo. Moving Total	Price as Percent of Moving Total	Price per bu.	12 Mo. Moving Total	Price as Percent of Moving Total	Price per bu.	12 Mo. Moving Total	Price as Percent of Moving Total
	Dollars	Dollars	Percent	Dollars	Dollars	Percent	Dollars	Dollars	Percent	Dollars	Dollars	Percent
Jan.				.27	3.90	6.92	.49	6.20	7.90	.85	9.52	8.93
Feb.				.27	4.16	6.49	.51	6.23	8.19	.82	9.71	8.44
Mar.				.27	4.36	6.19	.52	6.44	8.07	.79	9.74	8.11
Apr.				.34	4.54	7.49	.52	6.75	7.70	.81	9.69	8.36
May				.43	4.68	9.19	.52	7.09	7.33	.82	9.67	8.48
June				.44	4.87	9.03	.59	7.38	7.99	.82	9.48	8.65
July	.34			.60	5.07	11.83	.63	7.76	8.12	.82	9.13	8.98
Aug.	.35			.55	5.29	10.40	.76	8.12	9.36	.79	8.80	8.98
Sept.	.33			.51	5.53	9.22	.82	8.43	9.73	.77	8.50	9.06
Oct.	.31			.45	5.78	7.78	.79	8.70	9.08	.77	8.23	9.36
Nov.	.28			.47	5.96	7.88	.76	8.99	8.45	.57	7.94	7.18
Dec.	.27			.47	6.05	7.77	.85	9.29	9.15	.50	7.65	6.54

Table XXI - (Continued)

Month	1936			1937			1938			1939		
	Price per bu.	12 Mo. Moving Total	Price as Percent of Moving Total	Price per bu.	12 Mo. Moving Total	Price as Percent of Moving Total	Price per bu.	12 Mo. Moving Total	Price as Percent of Moving Total	Price per bu.	12 Mo. Moving Total	Price as Percent of Moving Total
	Dollars	Dollars	Percent	Dollars	Dollars	Percent	Dollars	Dollars	Percent	Dollars	Dollars	Percent
Jan.	.52	7.36	7.06	1.00	12.22	8.18	.57	8.43	6.76	.46	5.92	7.77
Feb.	.52	7.30	7.12	1.00	12.67	7.89	.54	7.79	6.93	.46	5.83	7.89
Mar.	.52	7.52	6.91	1.00	12.75	7.84	.54	7.24	7.46	.47	5.76	8.16
Apr.	.52	7.75	6.71	1.17	12.79	9.15	.54	6.72	8.04	.48	5.82	8.25
May	.53	7.95	6.67	1.21	12.56	9.63	.54	6.48	8.33	.49	5.84	8.39
June	.53	8.23	6.44	1.19	12.15	9.79	.55	6.41	8.58	.50	5.88	8.50
July	.76	8.79	8.65	1.21	11.72	10.32	.57	6.34	8.99	.48	5.94	8.08
Aug.	1.01	9.27	10.90	1.09	11.29	9.65	.54	6.23	8.67	.47	6.01	7.82
Sept.	1.00	9.75	10.26	1.04	10.83	9.60	.52	6.15	8.46	.58	6.09	9.52
Oct.	.97	10.23	9.48	.74	10.37	7.14	.50	6.08	8.22	.52	6.16	8.44
Nov.	.95	10.88	8.73	.54	9.74	5.54	.47	6.02	7.81	.51	6.23	8.19
Dec.	.96	11.56	8.30	.53	9.07	5.84	.46	5.97	7.70	.52	6.36	8.18

Table XXI - (Continued)

Month	1940			1941			1942			1943		
	Price per bu.	12 Mo. Moving Total	Price as Percent of Moving Total	Price per bu.	12 Mo. Moving Total	Price as Percent of Moving Total	Price per bu.	12 Mo. Moving Total	Price as Percent of Moving Total	Price per bu.	12 Mo. Moving Total	Price as Percent of Moving Total
	Dollars	Dollars	Percent	Dollars	Dollars	Percent	Dollars	Dollars	Percent	Dollars	Dollars	Percent
Jan.	.53	6.47	8.19	.64	7.79	8.22	.78	9.51	8.20	.89		
Feb.	.54	6.61	8.17	.63	7.91	7.96	.82	9.63	8.52	.91		
Mar.	.54	6.79	7.95	.63	8.02	7.86	.82	9.74	8.42	.94		
Apr.	.55	6.85	8.03	.67	8.18	8.19	.83	9.82	8.45	.98		
May	.62	6.96	8.91	.69	8.32	8.29	.84	9.91	8.48	1.00		
June	.61	7.09	8.60	.71	8.43	8.42	.84	10.00	8.40			
July	.62	7.21	8.60	.74	8.55	8.65	.86	10.09	8.52			
Aug.	.65	7.32	8.88	.76	8.69	8.74	.87	10.20	8.53			
Sept.	.64	7.41	8.64	.80	8.88	9.01	.88	10.29	8.55			
Oct.	.63	7.50	8.40	.77	9.07	8.49	.86	10.41	8.26			
Nov.	.64	7.62	8.40	.75	9.23	8.12	.84	10.56	7.95			
Dec.	.64	7.69	8.32	.76	9.38	8.10	.85	10.72	7.93			

Method of Computation. The method of computing the average seasonal variation for corn is shown in Table XXII.

Table XXII - CORN: Computation of Index of Average Seasonal Variation of Michigan Farm Prices, 1933-1942.

Month	Average of Percents of Moving Total For 10 Years (percent)	Index of Average Seasonal Variation (Individual Items Col. 1 ÷ Average of Col. 1) (percent)
January	7.81	94.1
February	7.76	93.4
March	7.70	92.7
April	8.04	96.8
May	8.37	100.8
June	8.44	101.6
July	9.07	109.2
August	9.19	110.7
September	9.21	110.9
October	8.46	101.9
November	7.82	94.2
December	7.78	93.7
Average	8.30	100.0

Each price, expressed as a percent of the 12-month moving total, was averaged by months for the 10-year period and appears in the first column in the table. To convert these monthly figures to an index number, each average monthly price (expressed as a percent of the moving total) was divided by the average for the 10-year period. For January, the index of 94.1 was calculated by dividing 7.81 percent by 8.30 percent and multiplying by 100. Thus the index of average seasonal variation shows the relationship between the average price in any one month and the average 10-year

adjusted price. To convert the index number to dollars per bushel, the average price of corn in the 10 years was multiplied by the average index of each month.

Index of Irregularity. The index of irregularity was computed as one standard deviation from each average monthly price (expressed as a percent of the moving total). The formula used was

$$\text{standard deviation } (\sigma) \sqrt{\frac{\Sigma(X^2)}{N} - \overline{X^2}}$$

where $\Sigma(X^2)$ was the summation of the squares of the prices prevailing in one month for ten years, N was the number of years (ten), and $\overline{X^2}$ was the square of the average monthly price. To compute the index of irregularity for corn for January in the period 1933 to 1942, the following computations were made:

January	Average Monthly Price (X)	Average Monthly Price Squared (X^2)
1933	6.92	47.8864
1934	7.90	62.4100
1935	8.93	79.7449
1936	7.06	49.8436
1937	8.18	66.9124
1938	6.76	45.6976
1939	7.77	60.3729
1940	8.19	67.0761
1941	8.22	67.5684
1942	8.20	67.2400
Average	7.81	61.47523

The value of the expression $\frac{\Sigma(X^2)}{N}$ was 61.47523, and the value of $\overline{X^2}$ or 7.81^2 was 60.9961. Substituting in

the formula, the value of one standard deviation becomes

$$\sigma = \sqrt{61.47523 - 60.9961}$$

or

$$= \sqrt{.47913}$$

or

$$= \pm .69,$$ and the index of irregularity was calculated by dividing $\pm$ .69 times 100 by 8.30 This gives a value of $\pm$ 8.3 percent, and the upper and lower limits of the zone of irregularity for corn in January 1933-1942 was 94.1 $\pm$ 8.3 or 102.4 and 85.8 respectively. The index of irregularity for other months was computed in the same manner. One standard deviation includes 68.27 percent of the cases or, roughly, seven years out of ten.

Adjusted Index for Large and Small Crops. For large and small crops, the adjusted index was computed for market years on the basis of whether or not United States production was 10 percent or more above or below the average for the 20-year period in any year. When total production varied less than 10 percent from the average, it was called an average crop.

Unadjusted Index for Rising or Falling Prices. An unadjusted index was used for showing the effect or rising or falling farm prices on the seasonal variation of livestock and livestock products prices. From January through December in the years 1923 to 1942, there were nine years when farm prices rose or fell less than 10 percent, six

years when farm prices rose more than 10 percent and five years when farm prices fell more than 10 percent. The average monthly prices were used directly for determining the seasonal variation of these products for the selected years.

APPENDIX B

The Use of A Circular Graph For Showing Average Seasonal Variation

THE USE OF A CIRCULAR GRAPH FOR SHOWING AVERAGE SEASONAL VARIATION

Introduction. A circular graph was devised to avoid some of the possible misconceptions which arise with the use of the conventional graph. In order to show the seasonal movement between each of the 12 months, 13 months must be included on the base line. This means that the first month at the beginning of the base line is usually repeated at the end of the base line. Thus, if the months run from January through December, and January is repeated following December, it may be thought of as a following January rather than the same one. The same criticism may be made, but to a lesser extent, for the charts used in this study. For these charts, a half-month interval was left at the beginning and the end of the 12-month period. The average seasonal variation for the half-month intervals was determined from the index values of the beginning and the ending months used. This method of charting is more valid since mid-month farm prices were used as a basis for determining the average seasonal variation.

Interpretation. The circular graph, similar to the one shown in Figure 65 can be interpreted by noting the relationship of the average seasonal variation line with the base (100 percent) line. When the average seasonal variation line was inside the base line, the price was below average. Conversely, when the average seasonal variation

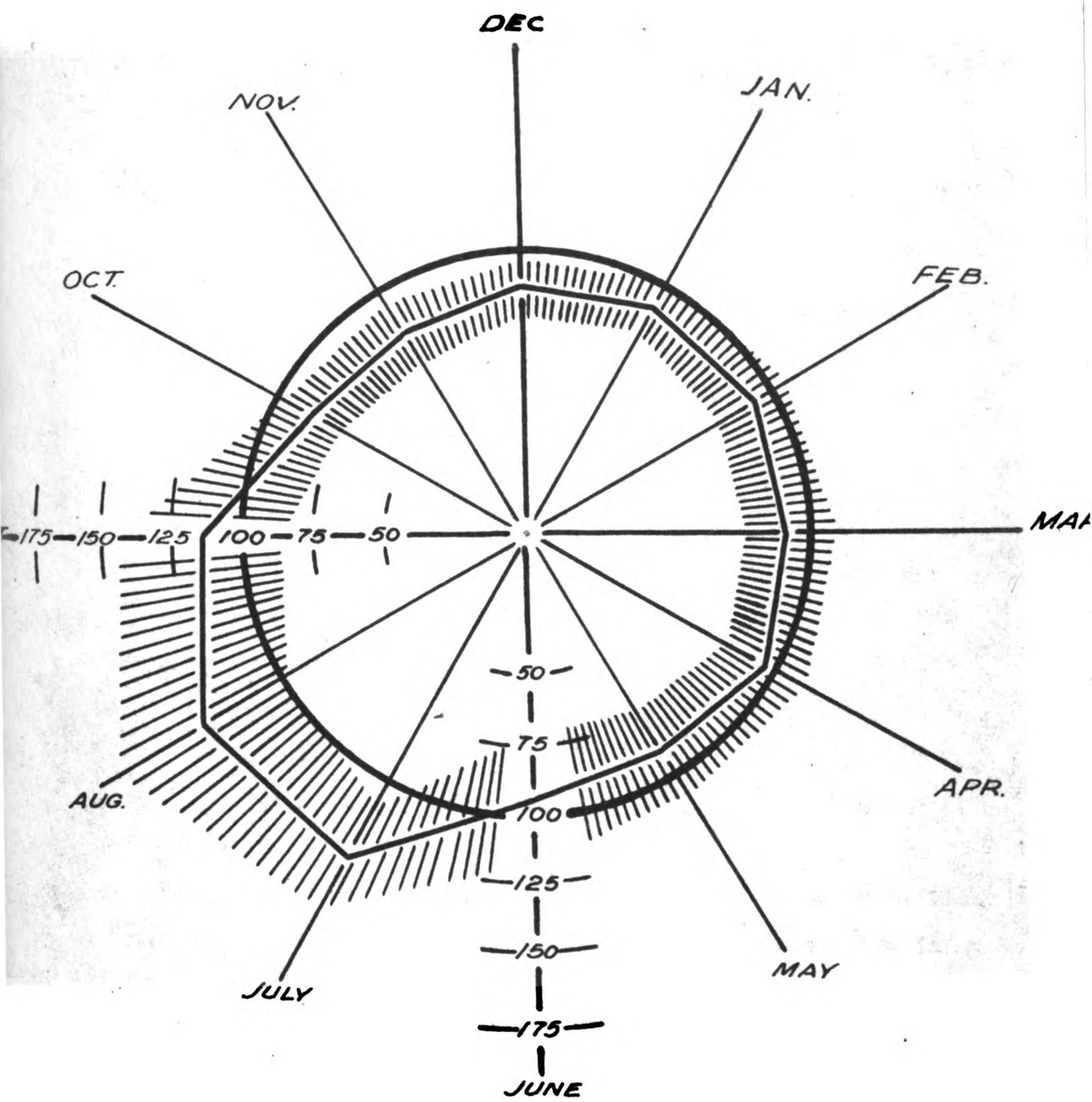


Figure 65. POTATOES: Index of Average Seasonal Variation of Michigan Farm Prices and Zone of Irregularity, 1933-1942. (Compare with Figure 19).

line was outside the base line, the price was above average.

Advantages of the Circular Graph. One advantage of the circular graph is that the lines are continuous. That is, if the months of the year run from January through December, there is a line connecting December with January. This avoids the possible misconception that arises when 13 months are shown on the base line. The amount of variation can be visualized by observing how far the average seasonal variation line is from the 100 percent line or by observing how far off-center the line appears in relation to the center of the base line. A circular graph may be interpreted more rapidly when the months of the year are associated with the numbers on the face of a clock. The sixth month of the year (June) appears in the same position as six on the face of a clock.

Disadvantages of the Circular Graph. The greatest disadvantage of the circular graph lies in its unconventional form. A price that is above average in December lies above the 100 percent line, while a price above average in June lies below the 100 percent line. Another disadvantage lies in the fact that the distances between months are distorted as the relative price for different months moves above or below the average for the year. Accuracy is sacrificed somewhat, since the scale must necessarily be reduced to get the chart into the same area.

Conclusions. The use of a circular chart depends upon what it is desirable to show. For ease of grasping and for generalizations it has some merit. However, its use should be limited when accuracy in reading or comparing other than adjacent months is desirable.

APPENDIX C
SUPPLEMENTARY TABLES

TABLE NUMBER — PAGE

TABLE Ia - CORN: Average Seasonal Variation of Michigan Farm Prices and Elevator Purchases, Selected Periods, 1910 to 1942.

Month	Average Seasonal Variation of Prices and Elevator Purchases								
	1910-1919		1923-'24 to 1942-'43						1933-'34 to 1942-'43 Monthly Purchases by Elevator
			Large crop 2/		Average crop 3/		Small crop 4/		
	Index	Price per 1/ bushel	Index	Price per 1/ bushel	Index	Price per 1/ bushel	Index	Price per 1/ bushel	
	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent
January	94.3	.91	94.5	.71	93.5	.64	96.5	.89	10
February	93.4	.90	94.7	.71	95.8	.65	93.4	.86	9
March	93.7	.90	92.9	.70	96.6	.66	94.3	.87	9
April	97.2	.93	95.3	.72	97.0	.66	99.0	.91	9
May	101.5	.97	99.5	.75	98.5	.67	100.2	.92	8
June	103.4	.99	101.2	.76	100.4	.69	102.5	.94	8
July	105.4	1.01	112.2	.84	104.4	.71	106.2	.98	7
August	108.8	1.04	112.2	.84	111.2	.76	105.0	.97	7
September	108.6	1.04	108.8	.82	113.2	.77	101.7	.94	8
October	102.8	.99	101.1	.76	101.6	.69	106.4	.98	6
November	96.4	.93	94.5	.71	94.2	.64	97.0	.89	9
December	94.5	.91	93.1	.70	92.6	.63	96.8	.89	10
Average	100.0	.96	100.0	.75	100.0	.68	100.0	.92	8.33

1/ Prices per unit are adjusted and rounded to nearest whole unit.
2/ Includes market years beginning in October in 1923, '25, '32, '41, and '42.
3/ Includes market years beginning in October in 1926, '27, '28, '29, '31, '33, '35, '37, '38, '39, and '40.
4/ Includes market years beginning in October in 1924, '30, '34, and '36.

TABLE IIa - WINTER WHEAT: Average Seasonal Variation of Michigan Farm Prices and Marketings, Selected Periods, 1910 to 1942.

Month	Average Seasonal Variation of Prices and Marketings								
	1910-1919		1923-'24 to 1942-'43						1933-'34 to 1942-'43
			Large Crop 2/		Average Crop 3/		Small Crop 4/		
	Index	Price per 1/ bushel	Index	Price per 1/ bushel	Index	Price per 1/ bushel	Index	Price per 1/ bushel	Monthly Marketings
	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent
January	101.9	1.38	103.0	1.00	105.6	1.01	103.9	1.08	6
February	102.7	1.39	105.4	1.02	103.9	1.00	104.4	1.09	6
March	101.3	1.37	106.1	1.03	101.5	.97	101.8	1.06	6
April	104.0	1.40	106.1	1.03	102.0	.98	102.0	1.06	5
May	106.7	1.44	107.7	1.04	105.2	1.01	98.2	1.02	5
June	102.1	1.38	100.1	.97	102.9	.99	95.9	1.00	5
July	96.3	1.30	95.5	.93	92.3	.89	102.3	1.06	21
August	95.3	1.29	90.1	.88	92.3	.89	99.7	1.04	17
September	96.4	1.30	94.3	.92	95.6	.92	97.9	1.02	10
October	97.5	1.32	94.3	.92	98.7	.95	96.7	1.01	7
November	97.6	1.32	97.3	.95	97.5	.94	97.2	1.01	6
December	98.2	1.33	100.1	.97	102.5	.98	100.0	1.04	6
Average	100.0	1.35	100.0	.97	100.0	.96	100.0	1.04	8.33

1/ Prices per unit are adjusted and rounded to nearest whole cent.
2/ Includes market years beginning in July 1927, '28, '30, '31, '38, '41, and '42.
3/ Includes market years beginning in July 1923, '24, '26, '29, '32, '37, '39, and '40.
4/ Includes market years beginning in July 1925, '33, '34, '35, and '36.

TABLE IIIa - OATS: Average Seasonal Variation of Michigan Farm Prices and Marketings, Selected Periods, 1910 to 1942.

Month	Average Seasonal Variation of Prices and Marketings								1933-'34 to 1942-'43 Monthly Marketings
	1910-1919		1923-'24 to 1942-'43						
			Large Crop 2/		Average Crop 3/		Small Crop 4/		
	Index	Price per 1/ bushel	Index	Price per 1/ bushel	Index	Price per 1/ bushel	Index	Price per 1/ bushel	
	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent
January	98.0	.50	101.2	.42	104.0	.40	101.1	.44	6
February	100.1	.51	101.8	.42	106.1	.40	101.8	.44	6
March	101.4	.51	100.7	.41	104.0	.40	104.1	.45	7
April	104.3	.53	102.1	.42	105.6	.40	106.0	.46	8
May	107.2	.54	106.3	.44	107.0	.41	102.3	.44	8
June	106.8	.54	107.4	.44	105.7	.40	98.6	.42	6
July	105.6	.53	112.0	.46	104.5	.40	96.4	.42	8
August	100.3	.51	95.4	.39	86.7	.33	100.9	.43	19
September	94.0	.48	91.7	.38	87.7	.33	102.4	.44	12
October	93.1	.47	93.5	.38	91.4	.35	94.1	.40	8
November	93.6	.47	92.0	.38	96.6	.37	94.9	.41	6
December	95.6	.48	95.9	.39	100.7	.38	97.2	.42	6
Average	100.0	.51	100.0	.41	100.0	.38	100.0	.43	8.33

1/ Prices per unit are adjusted and rounded to nearest whole cent.
2/ Includes market years beginning in July 1924, '25, '28, '30, '32, and '42.
3/ Includes market years beginning in July 1923, '26, '27, '29, '31, '35, '37, '38, '40, and '41.
4/ Includes market years beginning in July 1933, '34, '36, and '39.

TABLE IVa - BARLEY: Average Seasonal Variation of Michigan Farm Prices and Marketings, Selected Periods, 1910 to 1942.

Month	Average Seasonal Variation of Prices and Marketings								
	1910-1919		1923-'24 to 1942-'43						1933-'34 to 1942-'43 Monthly Marketings
			Large Crop 2/		Average Crop 3/		Small Crop 4/		
	Index	Price per 1/ bushel	Index	Price per 1/ bushel	Index	Price per 1/ bushel	Index	Price per 1/ bushel	
	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent
January	102.5	.87	100.0	.59	101.4	.65	102.0	.70	5
February	100.1	.85	103.3	.61	103.5	.66	101.7	.70	8
March	101.9	.86	102.7	.60	105.6	.68	100.7	.70	7
April	105.0	.89	103.7	.61	107.8	.69	103.3	.71	6
May	108.3	.92	103.7	.61	112.7	.76	101.1	.70	5
June	106.0	.90	101.6	.59	106.8	.68	100.7	.70	3
July	101.0	.86	100.9	.59	102.0	.65	93.4	.64	9
August	97.6	.83	92.5	.54	85.0	.54	100.1	.69	24
September	94.5	.80	95.0	.56	92.1	.59	98.1	.68	12
October	93.3	.79	97.0	.57	92.7	.59	98.9	.68	9
November	94.0	.80	98.9	.58	92.9	.60	99.0	.68	6
December	95.8	.81	100.7	.59	97.5	.62	101.0	.70	6
Average	100.0	.85	100.0	.59	100.0	.64	100.0	.69	8.33

1/ Prices per unit are adjusted and rounded to nearest whole cent.
2/ Includes market years beginning in August 1928, '29, '30, '32, '35, '39, '40, '41, and '42.
3/ Includes market years beginning in August 1927, '37, and '38.
4/ Includes market years beginning in August 1923, '24, '25, '26, '31, '33, '34, and '36.

TABLE Va - RYE: Average Seasonal Variation of Michigan Farm Prices and Marketings, Selected Periods, 1910 to 1942.

Month	Average Seasonal Variation of Prices and Marketings								
	1910-1919		1923-'24 to 1942-'43						1933-'34 to 1942-'43 Monthly Marketings
			Large Crop 2/		Average Crop 3/		Small Crop 4/		
	Index	Price per 1/ bushel	Index	Price per 1/ bushel	Index	Price per 1/ bushel	Index	Price per 1/ bushel	
	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent
January	100.7	1.02	106.4	.74	106.2	.62	102.0	.68	5
February	101.2	1.03	108.7	.75	102.0	.59	100.5	.67	4
March	102.3	1.04	105.0	.72	98.8	.57	99.4	.67	4
April	103.7	1.05	98.0	.68	101.7	.59	99.7	.67	3
May	104.0	1.06	96.2	.66	101.7	.59	96.8	.65	3
June	101.3	1.03	95.8	.66	94.6	.55	94.8	.64	3
July	97.0	.99	93.7	.65	93.2	.54	102.4	.69	15
August	96.2	.98	93.4	.64	95.1	.55	102.8	.69	26
September	96.2	.98	98.4	.68	102.5	.60	101.1	.68	15
October	97.4	.99	102.1	.70	100.6	.58	98.8	.66	9
November	99.7	1.01	100.0	.69	100.8	.59	100.0	.67	8
December	100.3	1.02	102.3	.71	102.8	.60	101.7	.68	5
Average	100.0	1.02	100.0	.69	100.0	.58	100.0	.67	8.33

1/ Prices per unit are adjusted and rounded to nearest whole cent.
2/ Includes market years beginning in July 1923, '24, '27, '35, '37, '38, '41, and '42.
3/ Includes market years beginning in July 1925, '28, '30, '32, '39, and '40.
4/ Includes market years beginning in July 1926, '29, '31, '33, '34 and '36.

TABLE VIa - FIELD BEANS: Average Seasonal Variation of Michigan Farm Prices and Marketings, Selected Periods, 1910 to 1942.

Month	Average Seasonal Variation of Prices and Marketings								
	1910-1919		1923-'24 to 1942-'43						1938-'39 to 1942-'43
			Large Crop 2/		Average Crop 3/		Small Crop 4/		
	Index	Price per 1/ cwt.	Index	Price per 1/ cwt.	Index	Price per 1/ cwt.	Index	Price per 1/ cwt.	Monthly Marketings
	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent
January	100.1	5.65	98.3	3.41	95.7	3.04	95.9	4.64	8
February	99.5	5.61	97.8	3.39	101.1	3.22	100.2	4.85	7
March	98.2	5.54	95.6	3.32	95.4	3.03	97.8	4.73	6
April	99.2	5.59	100.0	3.47	91.9	2.92	100.6	4.87	7
May	102.1	5.76	105.6	3.66	97.0	3.08	104.5	5.06	7
June	101.9	5.75	103.0	3.57	94.7	3.01	103.0	4.98	9
July	101.8	5.74	105.4	3.66	101.7	3.23	104.8	5.07	6
August	102.2	5.76	98.0	3.40	119.0	3.78	102.4	4.96	4
September	98.9	5.58	106.8	3.70	110.2	3.50	98.4	4.76	8
October	98.5	5.56	99.0	3.46	97.9	3.11	99.7	4.82	15
November	99.4	5.61	95.2	3.30	101.2	3.22	97.7	4.73	13
December	98.2	5.54	95.3	3.30	94.2	2.99	95.0	4.59	10
Average	100.0	5.64	100.0	3.47	100.0	3.18	100.0	4.84	8.33

1/ Prices per unit are adjusted and rounded to nearest whole cent.
2/ Includes market years beginning in September 1930, '37, '38, '39, '40, '41, and '42.
3/ Includes market years beginning in September 1929, '31, '33, and '35.
4/ Includes market years beginning in September 1923, '24, '25, '26, '27, '28, '32, '34, and '36.

TABLE VIIa - POTATOES: Average Seasonal Variation of Michigan Farm Prices and Marketings, Selected Periods, 1910 to 1942.

Month	Average Seasonal Variation of Prices								
	1910-1919		1923-'24 to 1942-'43						1933-'42 Monthly Marketings
			Large Crop 2/		Average Crop 3/		Small Crop 4/		
	Index	Price per 1/ bushel	Index	Price per 1/ bushel	Index	Price per 1/ bushel	Index	Price per 1/ bushel	
	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent
January	90.3	.74	98.3	.40	88.0	.66	100.0	1.34	12
February	93.2	.76	97.7	.40	88.8	.67	94.5	1.27	11
March	90.9	.75	84.3	.35	89.1	.67	96.6	1.29	12
April	89.7	.74	85.3	.35	95.1	.71	106.3	1.41	14
May	91.0	.75	75.2	.31	94.1	.71	107.8	1.44	8
June	91.7	.75	62.0	.25	100.4	.75	110.4	1.48	2
July	119.2	.98	127.9	.52	129.3	.97	107.7	1.44	0
August	138.4	1.14	159.2	.65	140.5	1.30	121.9	1.63	2
September	119.1	.98	141.9	.58	114.1	.86	96.7	1.30	5
October	96.5	.79	89.6	.37	92.1	.69	75.7	1.01	13
November	85.9	.70	86.9	.36	83.5	.63	91.6	1.23	12
December	94.1	.77	91.7	.38	85.0	.64	90.8	1.22	9
Average	100.0	.82	100.0	.41	100.0	.75	100.0	1.34	8.33

1/ Prices per unit are adjusted and rounded to the nearest whole cent.
2/ Includes market years beginning in July 1928 and '34.
3/ Includes market years beginning in July 1923, '24, '27, '29, '30, '31, '32, '33, '35, '37, '38, '39, '40, '41, and '42.
4/ Includes market years beginning in July 1925, '26, and '36.

TABLE VIIIa - HAY: Average Seasonal Variation of Michigan Farm Prices and Marketings, Selected Prices, 1910 to 1942.

Month	Average Seasonal Variation of Prices and Marketings								
	1910-1919		1923-'24 to 1942-'43						1933-'34 to 1942-'43 Monthly Marketings
			Large Crop 2/		Average Crop 3/		Small Crop 4/		
	Index	Price per 1/ ton	Index	Price per 1/ ton	Index	Price per 1/ ton	Index	Price per 1/ ton	
	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent
January	101.1	15.08	104.5	9.28	102.5	10.20	99.0	11.11	11
February	101.4	15.13	110.6	10.37	103.2	10.28	99.9	11.20	12
March	100.8	15.04	108.3	10.14	100.5	10.00	97.9	10.99	16
April	101.5	15.14	108.8	10.20	100.8	10.02	98.8	11.08	13
May	105.2	15.70	106.1	9.95	101.0	10.04	102.1	11.45	6
June	105.1	15.68	101.4	9.50	100.1	9.95	103.0	11.58	3
July	97.4	14.53	94.0	8.81	97.7	9.72	92.5	10.38	8
August	94.1	14.04	88.0	8.24	95.9	9.54	100.8	11.31	4
September	96.7	14.43	91.4	8.56	99.2	9.86	104.7	11.74	3
October	97.7	14.58	92.1	8.63	99.1	9.85	103.1	11.58	5
November	99.0	14.77	94.8	8.88	99.7	9.91	99.0	11.11	8
December	100.0	14.92	100.0	9.36	100.3	9.98	99.2	11.13	11
Average	100.0	14.92	100.0	9.37	100.0	9.95	100.0	11.22	8.33

1/ Prices per unit are adjusted and rounded to nearest whole cent.
2/ Includes market years beginning in July 1927, '40, '41, and '42.
3/ Includes market years beginning in July 1923, '24, '25, '26, '28, '29, '32, '35, '37, '38, and '39.
4/ Includes market years beginning in July 1930, '31, '33, '34, and '36.

TABLE IXa - APPLES: Average Seasonal Variation of Michigan Farm Prices, Selected Periods, 1910 to 1942.

Month	Average Seasonal Variation of Prices							
	1910-1919		1923-'24 to 1942-'43					
			Large Crop 2/		Average Crop 3/		Small Crop 4/	
	Index	Price per 1/ bushel	Index	Price per 1/ bushel	Index	Price per 1/ bushel	Index	Price per 1/ bushel
	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent	Dollars
January	104.9	1.01	104.0	.80	98.2	1.18	94.9	1.16
February	109.7	1.06	106.4	.88	100.8	1.21	99.2	1.21
March	114.4	1.10	109.2	.84	106.6	1.28	105.2	1.28
April	118.1	1.14	109.6	.84	111.4	1.34	110.4	1.35
May	116.5	1.12	127.8	.98	110.5	1.33	119.4	1.46
June	113.3	1.09	130.7	1.01	129.9	1.56	129.9	1.58
July	114.2	1.10	122.7	.95	123.1	1.48	116.4	1.42
August	76.8	.74	78.7	.61	88.4	1.06	89.4	1.09
September	70.8	.68	66.7	.51	72.8	.87	78.1	.95
October	76.2	.74	69.8	.54	77.4	.93	81.2	.99
November	87.2	.84	79.8	.61	88.1	1.06	83.7	1.02
December	97.9	.95	94.6	.73	92.8	1.12	92.2	1.12
Average	100.0	.97	100.0	.77	100.0	1.20	100.0	1.22

1/ Prices per unit are adjusted and rounded to nearest whole cent.
2/ Includes market years beginning in July 1926, '31, '35, '37, and '39.
3/ Includes market years beginning in July 1923, '24, '28, '30, '32, '33, '41, and '42.
4/ Includes market years beginning in July 1925, '27, '29, '34, '36, '38, and '40.

TABLE Xa - HOGS: Average Seasonal Variation of Michigan Farm Prices and Marketings, Selected Periods, 1910 to 1942.

Month	Average Seasonal Variation of Prices and Marketings								
	1910-1919 6/		1923 to 1942						1933 to 1942 Monthly Marketings
			Rising Prices 3/		Stable Prices 4/		Falling Prices 5/		
	Index	Price per 1/ cwt.	Index	Price per 2/ cwt.	Index	Price per 2/ cwt.	Index	Price per 2/ cwt.	
	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent
January	93.7	9.18	84.1	7.62	95.5	7.65	101.4	7.94	9
February	96.7	9.48	90.3	8.18	97.9	7.84	103.6	8.12	7
March	100.6	9.86	95.7	8.67	99.1	7.94	106.4	8.34	9
April	103.9	10.18	97.1	8.80	97.9	7.84	104.1	8.16	9
May	102.9	10.08	95.6	8.66	98.6	7.90	99.8	7.82	9
June	101.2	9.92	97.1	8.80	96.5	7.73	100.8	7.90	9
July	102.7	10.06	103.8	9.41	103.1	8.26	105.4	8.26	5
August	106.4	10.43	110.4	10.01	109.6	8.78	103.4	8.10	6
September	107.2	10.51	114.5	10.38	110.7	8.87	103.6	8.12	7
October	101.8	9.98	109.6	9.93	106.8	8.55	96.0	7.52	10
November	93.0	9.11	100.7	9.13	94.9	7.60	91.4	7.16	11
December	89.9	8.81	101.1	9.16	89.4	7.16	84.1	6.59	9
Average	100.0	9.80	100.0	9.07	100.0	8.01	100.0	7.84	8.33

1/ Prices per unit are adjusted and rounded to nearest whole cent.
2/ Prices per unit are unadjusted and rounded to nearest whole cent.
3/ Includes years 1923, '25, '34, '35, '41, and '42.
4/ Includes years 1924, '27, '28, '29, '33, '36, '37, '39, and '40.
5/ Includes years 1926, '30, '31, '32, and '38.
6/ January to June 1910 not included.

TABLE XIa - CATTLE: Average Seasonal Variation of Michigan Farm Prices and Marketings, Selected Periods, 1910 to 1942.

Month	Average Seasonal Variation of Prices and Marketings								
	1910-1919 6/		1923-1942						1933 to 1942 Monthly Marketings
			Rising Prices 3/		Stable Prices 4/		Falling Prices 5/		
	Index	Prices per 1/ cwt.	Index	Price per 2/ cwt.	Index	Price per 2/ cwt.	Index	Price per 2/ cwt	
	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent
January	95.2	6.18	88.2	5.91	94.7	6.48	107.6	6.36	9
February	97.3	6.31	91.8	6.15	95.3	6.52	105.6	6.24	7
March	102.2	6.63	98.6	6.60	96.5	6.60	105.3	6.22	9
April	107.5	6.98	100.2	6.71	100.1	6.85	106.9	6.32	9
May	108.6	7.05	103.1	6.90	103.3	7.07	104.6	6.18	9
June	107.5	6.98	103.4	6.92	104.7	7.16	103.6	6.12	9
July	104.2	6.76	103.4	6.92	103.5	7.08	100.8	5.96	8
August	100.8	6.54	103.1	6.90	103.8	7.10	96.8	5.72	8
September	98.7	6.41	104.7	7.01	103.5	7.08	95.4	5.64	8
October	96.0	6.23	102.5	6.86	99.6	6.81	92.7	5.48	9
November	92.4	6.00	99.6	6.66	97.5	6.67	91.7	5.42	8
December	89.6	5.82	101.4	6.79	97.5	6.67	89.0	5.26	7
Average	100.0	6.49	100.0	6.69	100.0	6.84	100.0	5.91	8.33

1/ Prices per unit are adjusted and rounded to nearest whole cent.
2/ Prices per unit are unadjusted and rounded to nearest whole cent.
3/ Includes years 1923, '25, '34, '35, '41, and '42.
4/ Includes years 1924, '27, '28, '29, '33, '36, '37, '39, and '40.
5/ Includes years 1926, '30, '31, '32 and '38.
6/ January to June 1910 not included.

TABLE XIb - BEEF STEERS: Average Seasonal Variation in the Prices Paid for Selected Grades and Index of Irregularity, Chicago, 1933 to 1942. 1/

Month	Choice and Prime			Good			Medium			Common			Good Cows		
	Index	Price per 2/ cwt.	Index of irregularity	Index	Price per 2/ cwt.	Index of irregularity	Index	Price per 2/ cwt.	Index of irregularity	Index	Price per 2/ cwt.	Index of irregularity	Index	Price per 2/ cwt.	Index of irregularity
	Percent	Dollars	Percent	Percent	Dollars	Percent	Percent	Dollars	Percent	Percent	Dollars	Percent	Percent	Dollars	Per cent
Jan.	100.4	11.34	12.7	97.6	9.68	11.4	99.3	8.43	7.7	98.2	6.91	7.1	96.6	6160	6.0
Feb.	100.8	11.38	15.1	96.9	9.61	11.2	98.0	8.32	9.6	101.1	7.12	8.3	98.0	6.69	10.0
March	101.1	11.41	10.9	99.8	9.90	9.1	100.9	8.57	8.5	105.7	7.44	10.9	102.5	7.00	11.6
April	101.1	11.41	11.0	100.1	9.93	9.5	101.9	8.65	8.8	107.1	7.54	8.6	106.7	7.29	11.1
May	98.0	11.06	10.4	99.6	9.88	7.6	103.3	8.77	6.5	109.4	7.70	7.4	108.3	7.40	8.3
June	94.9	10.71	9.6	98.1	9.73	7.2	102.1	8.67	5.2	104.5	7.36	4.3	105.0	7.17	6.5
July	97.5	11.01	9.1	101.0	10.02	8.2	102.9	8.74	6.5	100.9	7.10	7.0	102.0	6.97	6.5
Aug.	99.5	11.23	9.0	102.4	10.16	8.7	101.1	8.58	6.6	97.7	6.88	7.7	100.4	6.86	7.4
Sept.	102.8	11.61	8.5	104.5	10.37	6.3	101.2	8.59	5.9	97.4	6.86	7.5	99.3	6.78	7.4
Oct.	103.2	11.65	11.3	102.1	10.13	7.9	98.2	8.34	7.0	92.5	6.51	7.0	95.1	6.50	7.2
Nov.	100.3	11.32	10.6	99.2	9.84	6.9	95.4	8.10	7.2	92.4	6.50	8.6	93.5	6.39	7.7
Dec.	100.4	11.34	9.3	98.7	9.79	7.6	95.7	8.12	8.6	93.1	6.55	8.1	92.6	6.32	8.0
Average	100.0	11.29	10.6	100.0	9.92	8.5	100.0	8.49	7.3	100.0	7.04	7.7	100.0	6.83	8.1

1/ Source: Agricultural Statistics, U.S.D.A., 1941, and Livestock, Meats, and Wool Market Statistics and Related Data, U.S.D.A., P.M.A., 1944. (pages 44 and 45).

2/ Prices per unit are adjusted and rounded to nearest whole cent.

TABLE XIIa - VEAL CALVES: Average Seasonal Variation of Michigan Farm Prices and Marketings, Selected Periods, 1910 to 1942.

Month	Average Seasonal Variation of Prices and Marketings								
	1910-1919 6/		1923 to 1942						1933 to 1942 Monthly Marketings
			Rising Prices 3/		Stable Prices 4/		Falling Prices 5/		
	Index	Price per 1/ cwt.	Index	Price per 2/ cwt.	Index	Price per 2/ cwt.	Index	Price per 2/ cwt.	
	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent
January	102.5	9.56	95.0	9.70	103.5	10.98	114.3	10.78	9
February	101.7	9.49	101.0	10.31	105.1	11.14	112.4	10.60	7
March	102.3	9.54	101.0	10.31	100.7	10.68	108.2	10.20	9
April	99.1	9.25	95.1	9.71	96.9	10.28	102.0	9.62	10
May	93.2	8.70	92.6	9.46	93.7	9.94	91.4	8.62	10
June	96.5	9.00	91.1	9.30	92.9	9.85	92.3	8.70	10
July	99.6	9.29	95.6	9.76	94.4	10.01	93.8	8.84	9
August	100.5	9.38	100.2	10.23	99.0	10.50	95.7	9.02	7
September	103.8	9.68	108.5	11.08	105.4	11.18	101.4	9.56	6
October	103.5	9.66	109.0	11.13	106.6	11.30	101.0	9.52	7
November	98.4	9.18	104.3	10.65	101.3	10.74	94.2	8.88	8
December	98.9	9.23	106.6	10.88	100.5	10.66	93.3	8.80	8
Average	100.0	9.33	100.0	10.21	100.0	10.61	100.0	9.43	8.33

1/ Prices per unit are adjusted and rounded to nearest whole cent.
2/ Prices per unit are unadjusted and rounded to nearest whole cent.
3/ Includes years 1923, '25, '34, '35, '41, and '42.
4/ Includes years 1924, '27, '28, '29, '33, '36, '37, '39, and '40.
5/ Includes years 1926, '30, '31, '32, and '38.
6/ January to June 1910 not included.

TABLE XIIa - VEAL CALVES: Average Seasonal Variation of Michigan Farm Prices and Marketings, Selected Periods, 1910 to 1942.

Month	Average Seasonal Variation of Prices and Marketings								
	1910-1919 6/		1923 to 1942						1933 to 1942 Monthly Marketings
			Rising Prices 3/		Stable Prices 4/		Falling Prices 5/		
	Index	Price per 1/ cwt.	Index	Price per 2/ cwt.	Index	Price per 2/ cwt.	Index	Price per 2/ cwt.	
	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent
January	102.5	9.56	95.0	9.70	103.5	10.98	114.3	10.78	9
February	101.7	9.49	101.0	10.31	105.1	11.14	112.4	10.60	7
March	102.3	9.54	101.0	10.31	100.7	10.68	108.2	10.20	9
April	99.1	9.25	95.1	9.71	96.9	10.28	102.0	9.62	10
May	93.2	8.70	92.6	9.46	93.7	9.94	91.4	8.62	10
June	96.5	9.00	91.1	9.30	92.9	9.85	92.3	8.70	10
July	99.6	9.29	95.6	9.76	94.4	10.01	93.8	8.84	9
August	100.5	9.38	100.2	10.23	99.0	10.50	95.7	9.02	7
September	103.8	9.68	108.5	11.08	105.4	11.18	101.4	9.56	6
October	103.5	9.66	109.0	11.13	106.6	11.30	101.0	9.52	7
November	98.4	9.18	104.3	10.65	101.3	10.74	94.2	8.88	8
December	98.9	9.23	106.6	10.88	100.5	10.66	93.3	8.80	8
Average	100.0	9.33	100.0	10.21	100.0	10.61	100.0	9.43	8.33

1/ Prices per unit are adjusted and rounded to nearest whole cent.
2/ Prices per unit are unadjusted and rounded to nearest whole cent.
3/ Includes years 1923, '25, '34, '35, '41, and '42.
4/ Includes years 1924, '27, '28, '29, '33, '36, '37, '39, and '40.
5/ Includes years 1926, '30, '31, '32, and '38.
6/ January to June 1910 not included.

TABLE XIIIa - WHOLESALE MILK: Average Seasonal Variation of Michigan Farm Prices and Marketings, Selected Periods, 1910 to 1942.

Month	Average Seasonal Variation of Prices and Marketings								
	1910-1919		1923 to 1942						1933 to 1942 Monthly Production
			Rising Prices 3/		Stable Prices 4/		Falling Prices 5/		
	Index	Price per 1/ cwt.	Index	Price per 2/ cwt.	Index	Price per 2/ cwt.	Index	Price per 2/ cwt.	
	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent
January	115.6	2.27	98.2	2.06	103.6	2.05	110.8	1.94	7
February	114.9	2.25	97.4	2.04	102.2	2.02	106.2	1.86	7
March	105.1	2.06	96.6	2.03	98.8	1.96	104.0	1.82	8
April	89.9	1.76	95.7	2.01	96.3	1.91	100.5	1.76	8
May	78.5	1.54	92.6	1.94	92.9	1.84	95.9	1.68	10
June	75.1	1.47	91.4	1.92	90.4	1.79	91.4	1.60	11
July	85.4	1.67	95.0	1.99	94.3	1.87	93.1	1.63	10
August	94.8	1.86	100.5	2.11	98.8	1.96	98.2	1.72	9
September	100.5	1.97	103.7	2.18	102.7	2.03	101.7	1.78	8
October	109.7	2.15	107.7	2.26	105.3	2.08	101.1	1.77	8
November	113.1	2.22	110.0	2.31	107.8	2.13	99.4	1.74	7
December	117.4	2.30	111.2	2.33	106.9	2.12	97.7	1.71	7
Average	100.0	1.96	100.0	2.10	100.0	1.98	100.0	1.75	8.33

1/ Prices per unit are adjusted and rounded to the nearest whole cent.
2/ Prices per unit are unadjusted and rounded to the nearest whole cent.
3/ Includes years 1923, '25, '34, '35, '41, and '42.
4/ Includes years 1924, '27, '28, '29, '33, '36, '37, '39 and '40.
5/ Includes years 1926, '30, '31, '32 and '38.

TABLE XIVa - BUTTER: Average Seasonal Variation of Michigan Farm Prices and Manufacturings, Selected Periods, 1910 to 1942.

Month	Average Seasonal Variation of Prices and Manufacturings								
	1910-1919		1923 to 1942						1938 to 1942 6/
			Rising Prices 3/		Stable Prices 4/		Falling Prices 5/		
	Index	Price per 1/ pound	Index	Price per 2/ pound	Index	Price per 2/ pound	Index	Price per 2/ pound	Monthly Manufacturings
	Percent	Cents	Percent	Cents	Percent	Cents	Percent	Cents	Percent
January	110.7	35	95.3	35	104.9	39	112.5	36	7
February	104.9	34	98.6	36	102.7	38	103.8	33	7
March	101.0	32	97.5	36	101.6	37	103.1	33	7
April	99.4	32	98.0	36	99.1	36	100.0	32	8
May	95.5	30	95.8	35	96.1	35	96.2	31	11
June	89.6	29	93.9	34	93.7	34	88.8	28	12
July	88.6	28	93.9	34	96.4	35	90.6	29	10
August	91.9	29	97.2	36	96.4	35	95.0	30	9
September	96.3	31	100.2	37	98.6	36	99.4	32	9
October	102.7	33	104.9	38	101.6	37	103.1	33	8
November	107.2	34	111.1	41	102.7	38	103.1	33	6
December	112.2	36	113.6	42	106.2	39	104.4	33	6
Average	100.0	32	100.0	37	100.0	37	100.0	32	8.33

1/ Prices per unit are adjusted and rounded to nearest whole cent.
2/ Prices per unit are unadjusted and rounded to nearest whole cent.
3/ Includes years 1923, '25, '34, '35, '41 and '42.
4/ Includes years 1924, '27, '28, '29, '33, '36, '37, '39, and '40.
5/ Includes years 1926, '30, '31, '32 and '38.
6/ Monthly manufacturings of creamery butter.

TABLE XVa - BUTTERFAT: Average Seasonal Variation of Michigan Farm Prices, Selected Periods, 1923 to 1942.

Month	Average Seasonal Variation of Prices					
	1923 to 1942					
	Rising Prices 2/		Stable Prices 3		Falling Prices 4/	
	Index	Price per 1/ pound	Index	Price per 1/ pound	Index	Price per 1/ pound
	Percent	Cents	Percent	Cents	Percent	Cents
January	95.2	35	106.3	39	111.9	34
February	97.9	36	104.3	38	103.9	32
March	97.9	36	102.7	37	103.4	31
April	99.5	36	98.8	36	100.1	30
May	95.7	35	94.1	34	93.5	28
June	91.9	34	93.0	34	88.2	27
July	93.0	34	95.7	35	88.9	27
August	96.5	35	95.5	35	95.5	29
September	101.5	37	99.6	36	100.7	31
October	105.0	38	101.6	37	103.9	32
November	111.6	41	102.4	37	103.4	31
December	114.3	42	106.0	38	106.6	32
Average	100.0	36	100.0	36	100.0	30

1/ Prices per unit are unadjusted and rounded to nearest whole cent.
2/ Includes years 1923, '25, '34, '35, '41, and '42.
3/ Includes years 1924, '27, '28, '29, '33, '36, '37, '39, and '40.
4/ Includes years 1926, '30, '31, '32, and '38.

TABLE XVIa - SHEEP: Average Seasonal Variation of Michigan Farm Prices and Marketings, Selected Periods, 1910 to 1942.

Month	Average Seasonal Variation of Prices and Marketings								
	1910-1919 7/		1923-1942						1933 to 1942 6/
			Rising Prices 3/		Stable Prices 4/		Falling Prices 5/		
	Index	Price per 1/ cwt.	Index	Price per 2/ cwt.	Index	Price per 2/ cwt.	Index	Price per 2/ cwt.	Monthly Marketings
	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent
January	96.9	5.77	95.7	4.44	100.4	4.56	112.2	4.28	13
February	101.6	6.05	107.8	5.00	102.7	4.66	114.5	4.37	10
March	107.9	6.42	110.1	5.11	108.4	4.92	115.6	4.41	8
April	113.6	6.76	108.8	5.05	110.8	5.03	116.4	4.44	8
May	109.5	6.52	101.3	4.70	105.5	4.79	108.8	4.15	7
June	102.9	6.12	96.6	4.48	100.9	4.58	102.5	3.91	2
July	100.5	5.98	92.0	4.27	96.3	4.37	93.3	3.56	2
August	100.0	5.95	92.9	4.31	98.7	4.48	89.6	3.42	4
September	95.0	5.65	95.0	4.41	96.5	4.38	90.2	3.44	7
October	92.0	5.47	103.5	4.80	94.1	4.27	87.3	3.33	13
November	89.6	5.33	96.1	4.46	91.6	4.16	82.3	3.14	15
December	90.5	5.38	100.2	4.65	94.1	4.27	87.3	3.33	11
Average	100.0	5.95	100.0	4.64	100.0	4.54	100.0	3.82	8.33

1/ Prices per unit are adjusted and rounded to nearest whole cent.
2/ Prices per unit are unadjusted and rounded to nearest whole cent.
3/ Includes years 1923, '25, '34, '35, '41, and '42.
4/ Includes years 1924, '27, '28, '29, '33, '36, '37, '39, and '40.
5/ Includes years 1926, '30, '31, '32, and '38.
6/ Monthly marketings of both sheep and lambs.
7/ January to June 1910 not included.

TABLE XVIIa - LAMBS: Average Seasonal Variation of Michigan Farm Prices and Marketings, Selected Periods, 1910 to 1942.

Month	Average Seasonal Variation of Prices and Marketings								
	1910-1919 7/		1923 to 1942						1933 to 1942 6/
			Rising Prices 3/		Stable Prices 4/		Falling Prices 5/		
	Index	Price per 1/ cwt.	Index	Price per 2/ cwt.	Index	Price per 2/ cwt.	Index	Price per 2/ cwt.	Monthly Marketings
	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent
January	100.4	8.84	98.0	10.03	97.4	9.82	111.7	9.10	13
February	102.0	8.98	101.6	10.40	100.4	10.12	107.1	8.72	10
March	105.3	9.27	104.2	10.66	105.3	10.61	106.8	8.70	8
April	109.5	9.64	97.3	9.96	105.8	10.66	104.6	8.52	8
May	104.7	9.21	97.3	9.96	103.4	10.42	101.9	8.30	7
June	104.1	9.16	101.2	10.36	104.6	10.54	105.9	8.62	2
July	101.1	8.90	99.2	10.15	101.3	10.21	103.9	8.46	2
August	99.1	8.72	96.7	9.90	98.9	9.97	96.0	7.82	4
September	95.7	8.42	100.2	10.26	97.6	9.84	94.8	7.72	7
October	93.4	8.22	99.3	10.16	95.6	9.63	89.8	7.31	13
November	90.6	7.97	100.0	10.23	94.4	9.52	89.3	7.27	15
December	94.1	8.28	105.0	10.75	95.3	9.61	88.2	7.18	11
Average	100.0	8.80	100.0	10.23	100.0	10.08	100.0	8.14	8.33

1/ Prices per unit are adjusted and rounded to nearest whole cent.
2/ Prices per unit are unadjusted and rounded to nearest whole cent.
3/ Includes years 1923, '25, '34, '35, '41, and '42.
4/ Includes years 1924, '27, '28, '29, '33, '36, '37, '39, and '40.
5/ Includes years 1926, '30, '31, '32, and '38.
6/ Monthly marketings of both sheep and lambs.
7/ January to June 1910 not included.

TABLE XVIIIa - WOOL: Average Seasonal Variation of Michigan Farm Prices and Marketings, Selected Periods, 1910 to 1942.

Month	Average Seasonal Variation of Prices and Marketings								
	1910-1919 6/		1923 to 1942						1933 to 1942 Monthly Marketings
			Rising Prices 3/		Stable Prices 4/		Falling Prices 5/		
	Index	Price per 1/ pound	Index	Price per 2/ pound	Index	Price per 2/ pound	Index	Price per 2/ pound	
	Percent	Cents	Percent	Cents	Percent	Cents	Percent	Cents	Percent
January	100.0	34	99.0	35	96.8	32	124.7	27	-
February	98.0	34	99.0	35	96.2	31	120.9	26	-
March	97.4	34	101.4	36	95.3	31	106.9	23	-
April	98.1	34	99.0	35	94.1	31	95.6	20	21
May	96.3	34	98.4	35	98.1	32	90.0	19	21
June	102.9	35	100.9	36	99.9	33	85.3	18	21
July	103.1	36	100.9	36	100.5	33	91.9	20	21
August	102.7	35	99.0	35	99.9	33	94.7	20	5
September	101.4	35	99.5	35	102.1	33	96.6	21	5
October	100.1	34	99.5	35	104.1	34	97.5	21	2
November	101.0	35	101.8	36	105.7	35	97.5	21	2
December	99.0	34	101.8	36	107.3	35	98.4	21	2
Average	100.0	34	100.0	35	100.0	33	100.0	21	8.33

1/ Prices per unit are adjusted and rounded to nearest whole cent.
2/ Prices per unit are unadjusted and rounded to nearest whole cent.
3/ Includes years 1923, '25, '34, '35, '41, and '42.
4/ Includes years 1924, '27, '28, '29, '33, '36, '37, '39, and '40.
5/ Includes years 1926, '30, '31, '32, and '38.
6/ January to June 1910 not included.

TABLE XIXa - CHICKENS: Average Seasonal Variation of Michigan Farm Prices and Marketings, Selected Periods, 1910 to 1942.

Month	Average Seasonal Variation of Prices and Marketings								
	1910 - 1919		1923-1942						1939 to 1942 6/ Monthly Marketings
			Rising Prices 3/		Stable Prices 4/		Falling Prices 5/		
	Index	Price per 1/ pound	Index	Price per 2/ pound	Index	Price per 2/ pound	Index	Price per 2/ pound	
	Percent	Cents	Percent	Cents	Percent	Cents	Percent	Cents	Percent
January	93.9	13	88.1	15	97.0	17	106.1	18	3
February	97.2	14	92.9	16	99.4	17	106.6	18	2
March	103.0	15	100.6	18	102.5	18	106.5	18	3
April	107.9	15	106.3	18	106.8	19	112.0	19	3
May	107.1	15	105.0	18	106.9	19	108.5	19	4
June	103.8	15	102.2	18	101.1	18	102.3	18	6
July	104.4	15	102.5	18	100.3	18	100.5	17	11
August	103.7	15	101.0	18	100.0	18	100.3	17	15
September	104.0	15	105.6	18	101.4	18	97.4	17	13
October	97.8	14	100.0	17	97.1	17	91.2	16	16
November	89.8	13	97.1	17	94.7	17	84.8	15	13
December	87.4	12	98.7	17	92.8	16	83.8	15	11
Average	100.0	14	100.0	17	100.0	18	100.0	17	8.33

1/ Prices per unit are adjusted and rounded to nearest whole cent.
2/ Prices per unit are unadjusted and rounded to nearest whole cent.
3/ Includes years 1923, '25, '34, '35, '41 and '42.
4/ Includes years 1924, '27, '28, '29, '33, '36, '37, '39, and '40.
5/ Includes years 1926, '30, '31, '32, and '38.
6/ Monthly marketings for 1941 not available.

TABLE XXa - EGGS: Average Seasonal Variation of Michigan Farm Prices and Production, Selected Periods, 1910 to 1942.

Month	Average Seasonal Variation of Prices and Production								
	1910 - 1919		1923 to 1942						1933 to 1942
			Rising Prices 3/		Stable Prices 4/		Falling Prices 5/		
	Index	Price per 1/ dozen	Index	Price per 2/ dozen	Index	Price per 2/ dozen	Index	Price per 2/ dozen	Monthly Production
	Percent	Cents	Percent	Cents	Percent	Cents	Percent	Cents	Percent
January	128.5	36	109.8	30	112.3	29	120.3	29	7
February	113.1	32	96.4	27	101.4	26	95.1	23	7
March	88.8	25	79.8	22	80.3	21	82.0	20	11
April	79.8	22	76.2	21	74.0	19	78.6	19	13
May	81.6	23	78.4	22	74.0	19	76.1	18	13
June	81.1	23	79.1	22	72.8	19	77.0	18	11
July	83.0	23	85.3	24	82.2	21	82.0	20	9
August	87.7	25	92.5	26	96.3	25	87.9	21	8
September	96.2	27	104.8	29	104.1	27	102.6	24	6
October	106.9	30	118.8	33	120.5	31	120.7	29	5
November	121.4	34	141.6	39	142.8	37	141.8	34	4
December	131.9	37	137.3	38	139.3	36	135.9	32	6
Average	100.0	28	100.0	28	100.0	26	100.0	24	8.33

1/ Prices per unit are adjusted and rounded to nearest whole cent.
2/ Prices per unit are unadjusted and rounded to nearest whole cent.
3/ Includes years 1923, '25, '34, '35, '41, and '42.
4/ Includes years 1924, '27, '28, '29, '33, '36, '37, '39, and '40.
5/ Includes years 1926, '30, '31, '32, and '38.