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Cap. 3

WHEN TO MARKET GRAIN

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(This circular is a revision of Circular 516.)

WHEN TO MARKET GRAIN

By L. J. NORTON, Professor of Agricultural Economics

MARKETING GRAIN AT THE RIGHT TIME may mean more financially to many Illinois farmers than any other marketing decisions they make. The key question in deciding when to market corn, soybeans, wheat, and oats is: Will the price rise enough from harvest to the time of selling to cover the real costs of holding the grain? This circular is intended to help farmers answer that question by describing what usually happens to the price of cash grains and how much it costs to store these crops for different lengths of time.

WHEN TO MARKET CORN

Corn is the most important crop grown in Illinois. About 40 percent of it is sold, providing the third largest source of cash income to farmers in the state.

Corn is sold at all seasons of the year and is usually stored on farms until it is sold. In brief, these statements may be made about marketing the crop:

1. In recent years short-time storage (harvest to January) has usually paid, assuming only a modest allowance for the cost of crib space.
2. The average rise in price from harvest to spring and summer will repay the costs involved, if a moderate allowance is made for the use of cribs.
3. The chances of a substantial increase in price during the storage period have been fairly high and those of actual decline in price rather low.
4. Years of short corn crops, years of shrinking hog numbers, and deflation years are not good years for long storage because the best price under those situations tends to come early in the season. Two of these situations — size of crop and number of hogs — are known or can be readily anticipated at harvesttime.
5. Under the present schedule of price discounts for moisture,

a little can be gained by allowing ordinary cribbable corn to dry out before sale down to the limit for No. 2 grade (15.5 percent moisture). The gain, however, is not enough to offset any risk of decline in the level of corn prices. Nothing is gained by drying any further than this.

To what extent these statements apply in any particular year depends on a number of conditions, many of which are discussed below.

Sales of Corn Are Spread Over the Year

During the period 1920-1937, sales of corn for each month from October through February ran about 10 percent of the yearly total, dropped to about 6 percent for March and April, and ran to 7 or 8 percent from May through September (Table 1). The introduction of mechanical pickers and the higher yields of hybrid corn have not

Table 1.—Median Percent of Corn Sold in Each Month by Illinois Farmers, 1920-1937 and 1938-1950 Crops^a

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1920-1937.....	9	10	10	10	10	6	6	7	8	7	8	8
1938-1950.....	8	13	10	10	7	8	8	7	7	6	8	7

^a Data from Illinois Cooperative Crop Reporting Service.

greatly altered this pattern. Sales now appear to be a little heavier in November, probably reflecting over-run corn that cannot be cribbed.

This pattern of marketing reflects the following facts: (1) corn from the new crop must be stored on farms until its moisture content is low enough to be safe for tight bin storage; (2) corn can be stored easily on farms; (3) many farmers believe that it pays them to hold corn and have the financial resources to do so; (4) some farmers, particularly those who feed considerable corn, carry over any surplus for sale until they are sure about their new crop; and (5) the commercial use of corn for feed, wet and dry milling, distilling, and exports is distributed over the year.

Corn is now largely harvested in October and early November, although formerly the period of harvest was more extended. Because most of the corn grown in the United States is used in the states, the time of harvest in other countries has little effect on the seasonal behavior of corn prices in Illinois.

Prices Usually Rise From November to August

Over the period from 1908 to 1951, the price of corn rose more often than it fell each month from November to August (Table 2 and Fig. 1). From August to November the price usually declined as the market shifted from the old to the new crop. The tendency to rise was strongest from December to January, March to May, and June to July; the most marked declines were from September to November. In the short postwar period, the pattern has been much the same, except for a January-February break and a tendency for the top to come in July rather than in August.

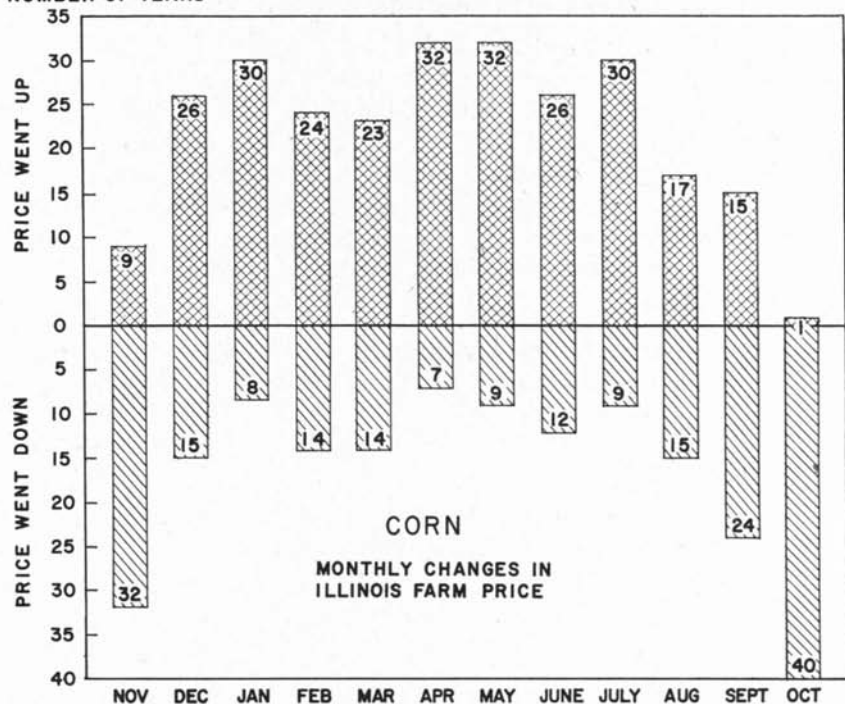
Changes from harvest to mid-January. The number of years that prices changed by different amounts from November 15 to January 15 (the recent early winter high) were:

Increases of:	1908-1951	1938-1951
Over 20 cents.....	1	1
16-20 cents.....	2	2
11-15 cents.....	5	2
6-10 cents.....	12	6
1-5 cents.....	5	0
No change.....	2	1
Decreases of:		
1-5 cents.....	15	2
6-10 cents.....	2	0
Median increase.....	4 cents	8.5 cents

Table 2. — Month-to-Month Changes in Mid-Month Illinois Farm Price of Corn

	1908-1951 crops			1945-1951 crops		
	Price up	Price down	No change	Price up	Price down	No change
	(number of years)					
October to November.....	9	32	3	1	5	1
November to December.....	26	15	3	5	1	1
December to January.....	30	8	6	3	1	3
January to February.....	24	14	6	2	3	2
February to March.....	23	14	7	5	2	0
March to April.....	32	7	5	7	0	0
April to May.....	32	9	3	4	2	1
May to June.....	26	12	6	3	3	1
June to July.....	30	9	5	5	2	0
July to August.....	17	15	12	2	4	1
August to September.....	15	24	5	4	3	0
September to October.....	1	40	3	0	7	0

NUMBER OF YEARS



For the 44 corn crops from 1908 to 1951 the price of corn more often went up than down each month from November to August. (Totals do not equal 44 because sometimes the month-to-month price did not change.) (Fig. 1)

For the forty-four year period 1908-1951, the median increase from November 15 to January 15 was only 4 cents, and in seventeen of the years the price declined. These declines, however, came in the earlier years of the period. Prices went up by 5 or more cents a bushel in somewhat less than half the years between 1908 and 1951.

In recent years the November to January gain has been greater and more frequent. During the period 1938-1951 the median increase from November to mid-January was 8.5 cents a bushel. In four out of five years the price went up 5 or more cents a bushel, and in one out of three years it rose more than 10 cents. Apparently the price of corn has been relatively weaker at harvesttime recently than it used to be, but has made a quicker recovery after harvest. This has happened both in years when the price was low enough for considerable corn to move into the loan and in years when the price was above the loan. Prices have probably been weaker recently at harvest than formerly

because crops have increased more than farm storage space, so that relatively more corn has to be sold at harvesttime, and trucks now permit rapid movement to elevators.

November to May. The number of years during the long and the short periods that prices changed by different amounts from November 15 to May 15 were:

Increases of:	1908-1951	1938-1951
Over 25 cents.....	9	4
21-25 cents.....	1	1
16-20 cents.....	6	2
11-15 cents.....	3	1
6-10 cents.....	11	3
1-5 cents.....	8	2
No change.....	0	0
Decreases of:		
1-5 cents.....	3	1
6-10 cents.....	2	0
Median increase.....	8.5 cents	13.5 cents

Over the 44-year period, increases of more than 15 cents a bushel came in 16, or nearly two-fifths of the years. The price declined in only five years.

In the more recent period the median increase was 13.5 cents, which means that storage from January to May added only 5 cents a bushel. In eight years the price advanced more than 10 cents a bushel from November to May compared with only five years for the November-January period.

November to July. The number of years during the long and short periods that prices changed by different amounts from November 15 to July 15 were:

Increases of:	1908-1951	1938-1951
Over 25 cents.....	11	4
21-25 cents.....	4	1
16-20 cents.....	6	2
11-15 cents.....	6	2
6-10 cents.....	8	2
1-5 cents.....	3	2
No change.....	0	0
Decreases of:		
1-5 cents.....	1	0
6-10 cents.....	2	0
11-15 cents.....	2	0
16-25 cents.....	0	0
Over 25 cents.....	1	1
Median increase.....	14 cents	15.5 cents

The influence of the new crop affects the July price, as does the cost of carrying from the previous harvest. Prospects that the new crop will be poor will raise the price for the old crop. This factor and the onset of periods of inflation were largely responsible for the many years when the July price was more than 25 cents above the price in the previous November.

The median increase for the 44-year period was 14 cents. Eleven years, or one-fourth of the years, saw an increase of more than 25 cents, but in 19 years the price either declined or increased less than 10 cents a bushel. For the more recent period, 1938-1951, the median increase was 15.5 cents a bushel. In a third of the years there was either a loss or an increase of 10 cents a bushel or less.

Farmers who followed a selective storage policy, avoiding long storage in years when the crop was short and when hog numbers were declining, probably realized larger storage earnings than the average shown above.

Why Seasonal Price Changes Vary

When seasonal prices vary from the average, it is usually because of an unusual corn crop, a large increase in number of hogs, or a change in the general price level. In most of the years from the end of World War II until 1952 one or more of these influences affected the seasonal pattern of corn prices.

A very short corn crop. With a very short crop of corn, the highest price has usually come early in the marketing season, in December or January, after which the price works lower. A short crop means that demand declines later in the season. Livestock numbers, especially of hogs, are reduced because of the high prices and the scarcity of feed. Also, in the summer after a short crop, users look forward to larger supplies from the new crop and economize on the use of corn.

The corn crop was short in 1947, and the farm price advanced from \$2.24 a bushel in November to \$2.57 (the all-time high in the Illinois farm price) in January, 1948. By April the price had dropped to \$2.23 and in July it was \$2.01. The price pattern of the year 1951-52, when total supplies of feed were believed to be short, was similar.

A large corn crop after a short crop. When a large crop follows a very short crop, livestock numbers and consequently the amount of corn used for feed are usually below average at the start of the marketing year. This means there will probably be more than enough corn throughout the marketing year. Unless a crop scare develops, prices

are likely to increase very little, as was shown when the large 1948 crop followed the short crop of 1947. The price of corn was fairly level for the next year — \$1.19 in November, \$1.26 in January, \$1.22 in April, and \$1.25 in July.

A large increase in number of hogs. When the number of hogs is greatly increased during a corn-marketing season, the price of corn is likely to advance more than usual, for supplies rapidly decline. During the marketing of the 1949 corn crop, hog numbers rose sharply, so the demand for corn increased. The price rose from 99 cents in November to \$1.27 in April and \$1.42 in July. (Most of this rise came well before the Korean War began.)

Changes in the general price level. A rapid rise in the general price level will tend to increase the seasonal rise in corn prices, while a fall in the general price level will result in lower seasonal rise for corn. From the end of the war in 1945 until the beginning of 1948, conditions were sharply inflationary; the price of corn advanced from \$1.06 (the ceiling price) in November, 1945, to \$2.05 the next July, and from \$1.20 in November, 1946, to \$2.03 the next July. During the moderately inflationary period from June, 1950, to February, 1951, the price of corn rose from \$1.35 in May, 1950, to \$1.66 in February, 1951. During the mildly deflationary period 1948-1950 the price of corn declined.

Cost of Storing Corn

There is no point, of course, in holding corn for a higher price if the cost of holding it will be more than the amount of the rise. The problem then is to determine how much the storage costs will be for holding corn. Five items need to be considered: interest, use of crib for storage, insurance, taxes, and shrinkage and deterioration, including insect and rodent damage.

Interest always a cost. When corn is sold early, interest may be earned on the proceeds, or debts may be paid and the interest on them saved. If corn is \$1.50 a bushel, the interest per bushel at different rates is as follows:

Interest for:

<i>* Rate</i>	<i>1 month</i>	<i>3 months</i>	<i>6 months</i>	<i>1 year</i>
4 percent.....	0.5 cent	1.5 cents	3 cents	6 cents
5 percent.....	0.62 cent	1.87 cents	3.75 cents	7.5 cents
6 percent.....	0.75 cent	2.25 cents	4.5 cents	9.0 cents
7 percent.....	0.88 cent	2.62 cents	5.25 cents	10.5 cents

Storage space not always a cost. Corn must be stored until it is sold or used. Cost of storage is therefore a logical charge against the crop rather than against the cost of holding it, for whether the cribs are in use for one or ten months makes little difference in the cost of providing and maintaining them. Of course if it is necessary to build additional storage space in order to hold a crop, the cost of erecting and maintaining it must be included in the storage costs.

Assuming that a good substantial crib costs about \$1 for each bushel of storage space, the yearly cost of its use will be about 10 cents a bushel (annual depreciation, upkeep, insurance, taxes, and interest on investment usually amount to about 10 percent of the original cost). Cribs of a more temporary type can be built at a lower cost, but they will depreciate faster.¹

If a farmer does not have enough crib space to hold all his corn in a large crop year, he can always shell out part of the crop and sell. The decisions of many farmers to dispose of their over-run corn in this way may explain the recent tendency for prices to be lower at harvest-time and then to make an early advance (harvest to January 15).

Most Illinois farmers simply cannot store new corn away from the farm unless they first dry the corn so as to reduce the moisture to a safe level for storage. Few Illinois country elevators are equipped to do artificial drying. The general use of picker-shellers would of course make it necessary to dry the corn before storage.

The cost of elevator storage, once the corn is dry enough for it, mounts rapidly. At a charge of 1/20 cent a day, storage for three months would cost 4.5 cents a bushel. After corn has been carried in cribs until it is dry enough for elevator storage, it can as well be carried as ear corn until it is shelled and sold in midsummer.

Insurance charges vary. Insurance is an item in the cost of storage, for the risk of loss exists whether it is carried by the owner or passed on to an insurance company by payment of a premium. Insurance costs vary according to the type of company writing the policy, the risks insured against, and the character of the storage space. Many farmers have insurance with mutual companies where the charges are based on actual losses.

As an illustration of costs, the rates quoted by one company writing insurance on Illinois farmers' grain for "fire and extended coverage" per \$1,000 are: 90 days, \$2.66; 6 months, \$4.56; 9 months, \$6.08.

With corn at \$1.50 a bushel and these rates, the insurance would

¹ Information on the construction of cribs may be obtained on request from the Department of Agricultural Engineering, University of Illinois, Urbana.

be about 0.4 cent a bushel for three months, about 0.7 cent for 6 months, and about 0.9 cent a bushel for nine months.

Taxes. If corn is sold before the assessment date, taxes are not a cost. If it is sold afterwards, they are. If corn is assessed at \$1 a bushel, taxes will amount to 1 cent a bushel for each dollar of tax rate per \$100 of assessed valuation. The assessment date in Illinois is April 1.

Shrinkage cost. Under present methods of pricing corn, the price varies with the moisture content, and the higher price for drier corn may largely offset the loss in weight due to moisture. But there will be some other loss in weight due to handling, rodent infestation, and deterioration in the corn. No actual data on such losses are available. We will assume the following rates of shrinkage other than moisture: 3 months—0.5 percent; 6 months—0.75 percent; 9 months—1 percent.

Total storage costs. The costs considered so far may be summarized as follows, assuming \$1.50 corn:

	<i>For 3 months</i>	<i>For 6 months</i>	<i>For 9 months</i>
Allowance for crib.....	0-10 cents	0-10 cents	0-10 cents
Interest at 5 percent.....	1.9 cents	3.8 cents	5.6 cents
Insurance.....	0.4 cent	0.7 cent	0.9 cent
Taxes.....	0	2.0-2.5 cents	2.0-2.5 cents
Shrinkage.....	0.8 cent	1.1 cents	1.5 cents
Total, without crib allowance.....	3.1 cents	7.6-8.1 cents	10.0-10.5 cents
Total, with crib allowance..	13.1 cents	17.6-18.1 cents	20.0-20.5 cents

These compare with the following median increases in the Illinois farm price of corn for the 1938-1951 crops:

November 15 to January 15—8.5 cents
November 15 to May 15—13.5 cents
November 15 to July 15—15.5 cents

These average increases exceed the minimum estimates of the storage costs, when no allowance is made for use of crib, by the following amounts: 3 months, 5.4 cents; 6 months, 5.9 cents; and 9 months, 5.5 cents.

Comparing Shrinkage and Discounts

When corn is sold by grade, either as shelled corn (as is common in Illinois) or as ear corn, the loss in weight does not always reduce its total value. Shrinkage is largely a loss of moisture, and such loss is likely to improve the price. The grade requirements for shelled corn

**Table 3.—Grade Requirements for Yellow Corn,
White Corn, and Mixed Corn**

(U. S. Department of Agriculture standards)

Grade No.	Minimum test weight per bushel	Maximum limits of—			
		Moisture	Cracked corn and foreign material	Damaged kernels	
	<i>lb.</i>	<i>perct.</i>	<i>perct.</i>	<i>perct.</i>	<i>perct.</i>
1.....	54	14	2	3	.1
2.....	53	15.5	3	5	.2
3.....	51	17.5	4	7	.5
4.....	48	20	5	10	1.0
5.....	44	23	7	15	3.0
Sample grade.....	Sample grade shall include corn of the class Yellow Corn, or White Corn, or Mixed Corn, which does not come within the requirements of any of the grades from No. 1 to No. 5, inclusive; or which contains stones and/or cinders; or which is musty, or sour, or heating, or hot; or which has any commercially objectionable foreign odor; or which is otherwise of distinctly low quality.				

are listed in Table 3. A reduction in moisture content from 20 percent to 14 percent improves the grade from No. 5 to No. 1 if the corn meets other specifications for No. 1 corn.

If, however, some factor other than moisture content determines the grade, then shrinkage may become an item of cost. In farm-stored corn, damage to kernels (chiefly by insects, molds, and rots) often lowers the grade. If corn is so damaged as to grade No. 4, for example, drying it from 20 percent to 14 percent will not raise the grade to No. 1; it will still be No. 4. But the drier corn will usually sell at a somewhat higher price.

When shelled corn is sold. When corn is cribbed it usually is fairly high in moisture content. During the winter season it may dry out a little if the weather is dry and cold. As warmer weather comes on it really dries out and the moisture content reaches a low point in the summer. Corn with 18-19 percent moisture when cribbed may be down to 15 percent in April and to 13-14 percent in July. As it loses moisture it loses weight and so there are fewer bushels, but it grades higher, and until it reaches the maximum limit (15.5 percent for No. 2) progressively smaller discounts will be taken.

Whether shrinkage is to be considered a storage cost depends both on the price level of corn and on the discount taken for moisture.

Table 4. — Shrinkage in Shelled Corn Dried Naturally to Specified Moisture Contents, Assuming 1,000 Bushels When Cribbed

Moisture in corn when cribbed	Original grade, if moisture is limiting factor	Amount of corn remaining ^a when moisture is reduced to—							
		19 perct.	18 perct.	17 perct.	16 perct.	15 perct.	14 perct.	13 perct.	12 perct.
<i>perct.</i>		<i>bu.</i>	<i>bu.</i>	<i>bu.</i>	<i>bu.</i>	<i>bu.</i>	<i>bu.</i>	<i>bu.</i>	<i>bu.</i>
28.....	Sample	889	878	867	857	847	837	828	818
26.....	Sample	914	902	892	881	871	860	851	841
24.....	Sample	938	927	916	905	894	884	874	864
23.....	5	951	939	928	917	906	895	885	875
22.....	5	963	951	940	929	918	907	897	886
21.....	5	975	963	952	940	929	919	908	898
20.....	4	988	976	964	952	941	930	920	909
19.....	4	1,000	988	976	964	953	942	931	920
17.5.....	3	994	982	971	959	948	938

^a The quantities listed were obtained by dividing the percentage of dry matter in the corn at the beginning of storage (100 minus original percentage of moisture) by the percentage of dry matter remaining at the end of the storage period (100 minus final percentage of moisture) and multiplying by 1,000.

Unless the grade is lowered by damage or some other factor besides moisture, the bushel price will be higher for drier corn.

How many bushels of corn will be left after corn has dried out to different degrees are shown in Table 4 (no allowance is made for any loss in weight except what is caused by loss of water). Suppose you have 1,000 bushels of corn with 19-percent moisture. If you carry it until it is down to 15 percent, the table shows that you will have 953 bushels left. Or if you carry the corn until it has 13-percent moisture, you will have 931 bushels. Notice that the amount of shrinkage is not simply the difference between the original moisture and the final moisture, but is based on the difference in dry matter at the two times (see footnote, Table 4).

To find out which will bring you the most money, you must know the discount scale being applied by the buyers. For the 1951 crop a common scale was: deduct 1½ cents for each ½ percent of moisture above 15.5 percent to 20 percent; and then deduct 2 cents for each ½ percent of moisture to 23 percent.

With No. 2 corn at \$1.50 the arithmetic works out: Nineteen-percent corn has 3.5 percent of moisture over 15.5 percent, or seven ½ percents: $7 \times 1.5 = 10.5$ cents. If No. 2 corn is \$1.50, then 19-percent corn is worth \$1.395. No premiums are now paid for corn with less than 15.5 percent moisture. So both 15-percent and 13-percent moisture corn will be worth \$1.50. The values for this lot of corn at different stages of dryness would be:

1,000 bushels of 19-percent corn at \$1.395 a bushel = \$1,395
 953 bushels of 15-percent corn at \$1.50 a bushel = \$1,429.50
 931 bushels of 13-percent corn at \$1.50 a bushel = \$1,396.50

Under this discount scale, this lot of corn will bring the highest returns when sold as No. 2 corn (15 percent). The increase in value is approximately \$35 for 1,000 bushels. This \$35 or 3.5 cents a bushel is the return for storing it until it is down to No. 2 moisture. Since no premiums are paid for individual lots of corn below 15.5 percent moisture, any further drying does not add to the price per bushel and so will reduce total returns.

When the average corn being received at an elevator is drier than No. 2, this may be reflected in the "bid price" under what is called the f.a.q. principle (fair average quality). Corn buyers may pay a higher price if they know that most of the corn they are getting is low in moisture.

Why should there be discounts for moisture? There are two reasons. First, water is not worth so much as corn, and high-moisture corn has more water. Second, with higher moisture the risk of spoilage in storage increases. When the moisture is too high, the corn must be artificially dried if it is to be stored. Artificial drying costs money.

Does artificial drying pay? Only if the cost, which includes investment and maintenance of equipment, fuel and operation, and the "invisible" loss in weight which occurs when corn is subjected to heat, is less than the increase in value plus the value of advantages which may be associated with the storage of shelled dried corn.

When 1,000 bushels of 19-percent corn are dried to 15 percent they are worth about \$35 more, or 3.5 cents a bushel.

If we start with 22-percent corn, the problem is the same. At the present price scale, the discount on such corn would be 21.5 cents a bushel, calculated as follows:

9×1.5 , or 13.5 cents, for the nine $\frac{1}{2}$ percents between 20 and 15.5 percent;

4×2 , or 8 cents, for the four $\frac{1}{2}$ percents between 22 and 20 percent.

Adding 13.5 cents and 8 cents we get 21.5 cents.

One thousand bushels of 22-percent corn are equivalent to 918 bushels of 15-percent corn (Table 4). The comparative values are:

1,000 bushels at \$1.285 (\$1.50 less \$.215 discount) = \$1,285

918 bushels at \$1.50 = \$1,377

The increase in value, under these discounts, would be \$92 or 9 cents a bushel.

In this case drying would also reduce the possibility of damage developing if the 22-percent corn were stored.

Artificial drying of corn has other advantages besides the increase in value. It permits early harvesting, when weather and ground conditions are good and field losses are at a minimum. Dried shelled corn can be stored more cheaply than ear corn; if new storage space is a consideration, the difference would be about 5 cents a bushel in the annual cost of providing space. Drying may permit safe storage in years and places when corn is too high in moisture to be safely stored.

Sale of ear corn. In some sections of the state, corn is sold as ear corn. The main problem involved in this method of sale is how many pounds are taken for a bushel.

The pounds taken for a bushel should be such as to yield 56 pounds of shelled corn. The true market value of a bushel of ear corn is obviously equal to the value of the shelled corn less the cost of shelling. An equivalent weight can be determined only by a test. Shell a good sample and calculate the weight of ear corn that yields 56 pounds of shelled corn. For example, if 75,000 pounds of ear corn shells out 56,000 pounds of corn, then 75 pounds of ear corn is equivalent to a bushel of shelled corn.

Such tests should be made each year and each season as various factors, particularly moisture, will determine this ratio. A key problem in marketing any farm product is the method of pricing. The fewer factors that are uncertain, the more nearly will the farmer's price reflect the real value of the product. Determining for each year or season the quantity of ear corn equivalent to a bushel of shelled corn eliminates guess work or custom from pricing corn.

Since high-moisture corn has more water in the cobs than dry corn, more pounds per bushel of ear corn are required to yield a bushel of ear corn at harvesttime or early in the winter than later in the year.

Other Considerations in Storing Corn

Other factors besides costs and shrinkage should be considered in deciding whether and how long to store corn. You may want to time the marketing so that it will not interfere with your field work, although the use of trucks in hauling corn makes this consideration less important than it once was. You may also need to consider the condition of the roads and your yard.

High amount of moisture is not the only factor that reduces the grade of corn (Table 3). Appreciable damage during storage will hold down the grade, even though moisture content has been reduced, and may prevent the higher price that usually goes with loss in moisture.

Insect damage in stored corn is important in southern Illinois and a growing problem in central Illinois. Losses from rats and other rodents can be serious, though if cribs are properly built and other precautions are taken, such losses will be small.

WHEN TO MARKET SOYBEANS

Soybeans are the second most important cash grain crop sold by Illinois farmers. In 1949-50 soybeans earned 11.3 cents of each dollar of cash farm income in Illinois and were the fourth largest source of farm income. The crop is harvested over a period of a few weeks in the United States, and the same season of harvest prevails in the only other major source of production, Manchuria. The crop has always been used up by the next harvest.

Since 1938 the crop has been sold earlier than it was during the twelve years before 1938. This marketing pattern reflects more rapid and earlier harvesting and the fact that the average crop is now much larger. The pattern of the marketing of soybeans by Illinois farmers for the 1926-1937 and 1938-1951 crops is shown in Table 5.

Soybean prices reflect the combined value of the oil and meal made from the soybeans. The prices of these products are in turn affected by supplies and demands for two groups of related products. For the

Table 5.—Median Percent of Soybeans Sold in Each Month by Illinois Farmers, 1926-1937 and 1938-1951 Crops*

	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.
1926-1937 crops	4	22	22	13	6	5	5	5	5	5	4	4
1938-1951 crops	4	49	17	5	4	2	4	4	5	3	2	1

* Data from Illinois Cooperative Crop Reporting Service.

oil these include cottonseed oil, lard, and linseed oil in the United States, and a large number of other oils and fats in world markets. For the meal it includes cottonseed meal, linseed meal, all other protein feeds, and the basic feed grains such as corn. Changes in the prices of these products may either sharply raise or lower the price of soybeans during a marketing season.

From 1945 to 1950 these other products operated to cause a sharp increase in the October-May spread of soybean prices in four of the six years. The average producer, however, does not have the knowledge to predict such changes—in fact, it is unlikely that anyone does.

Two generalizations, however, can be made about the time to market soybeans:

1. In the past it usually paid to store soybeans, as prices rose after harvest more than the cost of storage. But it is by no means certain that this will be as true in the future. At present many Illinois farmers are convinced by their own experience that it pays to store at least part of their soybeans.

2. It is well to avoid heavy storage in years when generally deflationary forces are operating. These will pull soybean prices down along with the prices of other commodities.

The basic reason why it should ordinarily pay to store soybeans, except in years when the over-all price level is going down, is that costs are incurred in storage and these costs can be earned only by price rises.

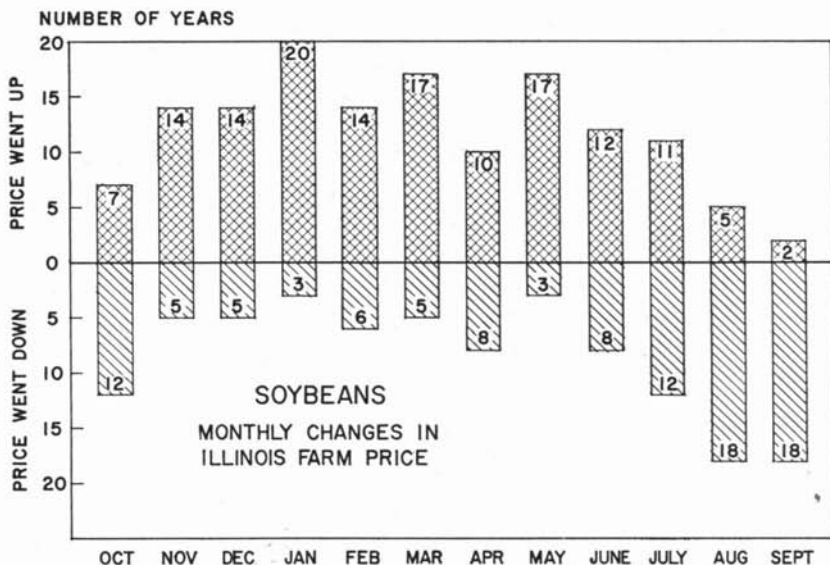
Price Changes During Storage

Month-to-month changes. For only two of the 27 crops from 1925 through 1951 was the May price below that of the previous October. Declines have been fairly common, however, from one month to the next (Table 6 and Fig. 2).

The price of soybeans rose more commonly than it fell each month from October to June and went down more commonly than it rose each month from June to October. The tendency to rise was most marked from December to January and least strong from March to April and from May to June. (The fact that price ceilings were in

Table 6. — Month-to-Month Changes in Mid-Month Illinois Farm Price of Soybeans, 1925-1951 Crops

	Price up	Price down	No change
	(number of years)		
September to October.....	7	12	8
October to November.....	14	5	8
November to December.....	14	5	8
December to January.....	20	3	4
January to February.....	14	6	7
February to March.....	17	5	5
March to April.....	10	8	9
April to May.....	17	4	6
May to June.....	12	8	7
June to July.....	11	12	4
July to August.....	5	18	4
August to September.....	7	18	2



For the 27 soybean crops from 1925 to 1951 the price was more commonly higher than the previous months from November through June. Often there was no change because of price ceilings during part of the period. (Fig. 2)

effect during some of the years increases the number of years when no changes occurred.)

October to January. For the crops from 1925 through 1951, the changes in soybean prices from harvest to mid-January were as follows:

Increases of:	
Over 50 cents.....	3
31-40 cents.....	3
21-30 cents.....	3
16-20 cents.....	1
11-15 cents.....	1
6-10 cents.....	3
1-5 cents.....	8
No change.....	2
Decreases of:	
1-5 cents.....	2
6-10 cents.....	0
Over 40 cents.....	1
Median increase.....	10 cents

In five of the 27 years, or nearly one year in five, the price either went down or did not change. In nearly half the years the increases were 5 cents a bushel or less.

Except under special circumstances, there is no evidence of a large increase in price in the first three months after October 15. The three years with very large increases came in the 1945-1952 period, when the situation was inflationary. The six years of increases from 21 to 40 cents a bushel were 1928, 1934 and 1936 (both drouth years), 1939 (when war began in Europe), and 1940 and 1943 (wartime years).

October to May. During the same 27 years, the changes in the Illinois farm prices of soybeans from October 15 to May 15 were as follows:

Increases of:	
More than 65 cents.....	3
51-65 cents.....	5
36-50 cents.....	3
21-35 cents.....	6
11-20 cents.....	2
1-10 cents.....	5
No change.....	1
Decreases of:	
1-10 cents.....	0
11-20 cents.....	2
Median increase.....	30 cents

This median increase of 30 cents exceeds storage costs.

The risk of an actual loss in price from holding soybeans until May has been small. In only three crop years from 1925 to 1951 was there a loss or no increase, or one year in nine. These three years were all governed by special circumstances: 1930-31, the onset of the 1930-1932 price decline; 1937-38, a year of general reaction in prices; and 1948-49, when the primary postwar inflation ended. In the five years when the increases were less than 10 cents, ceiling prices were in effect.

There were several years of substantial gains. Increases were 50 cents or more a bushel in 9 years out of the 27. Farmers' experience of little loss and the possibility of substantial gains explains why they have developed a strong belief that it pays to store soybeans.

Figuring Storage Costs

Storage costs of course vary, depending on whether the beans are stored on the farm or at an elevator. But for \$2.50 soybeans stored until May the costs are about as follows:

5 percent interest for seven months.....	7.3 cents
Storage for 210 days at 1/20 cent a day.....	10.5 cents
Taxes.....	4.0 cents
Total.....	21.8 cents

The taxes assume a \$2 assessment and a tax rate of \$2 per \$100.

Taxes are assessed in Illinois if the soybeans are on hand on the assessment date, April 1. There will be no shrinkage cost to the farmer on soybeans stored at an elevator and probably very little if stored in farm bins, except for handling losses.

Thus storage costs for \$2.50 soybeans are around 22 cents a bushel for storage until May. Actually, during the 27-year period they were somewhat less than this because the price was lower. Also, a farmer with a satisfactory bin might not allow more than 5 cents a bushel for such space (10 percent of 50 cents a bushel). This would make the above costs 16.3 cents.

These costs compare with a median increase of 30 cents a bushel in the 1925-1951 period. In only 17 of the years, however, did the price increase by more than 20 cents a bushel.

Seasonal Price Spreads May Narrow in the Future

It is doubtful that the period 1925-1951 can be taken as typical of what to expect of soybean prices in the future. It included 16 years when Illinois farm prices were moving up, 10 years when they were going down, and one year with no change. In general, the period was more favorable to profitable storage than an average period in the future is likely to be. This is partly due to the increase in farm storage and the introduction of futures markets.

More storage. The steady increase in storage facilities on farms, at country elevators, and at mills has made it easier for farmers to delay sales. Ordinarily such a situation may be expected to reduce the seasonal rise in price.

Introduction of futures markets. Another change has been the introduction of futures markets in soybeans, soybean oil, and soybean meal. Futures markets reduce the cost of risk in handling the crop by broadening the market for risk and making it easier to hedge inventories of soybeans and soybean products. They may also act to narrow the seasonal rise in the price of soybeans. The futures markets did not have this effect in the 1945-1952 period, a period of unusual situations, all related to its generally inflationary character.

CCC loans. So far, Commodity Credit Corporation loans have not had much effect on the behavior of Illinois soybean prices. Prices have usually been above the loan rates. The loans have been used occasionally as a comparatively cheap and liberal source of credit. The price of soybean oil and meal, and not government loans, has made the price of soybeans.

WHEN TO MARKET WHEAT

Wheat ranks third among the Illinois grain crops as a source of cash income. In 1949-50 it was seventh among all products as a source of cash income, earning 3.9 cents out of each dollar of Illinois farm sales.

Illinois wheat is harvested later than the bulk of the winter wheat crop in the United States, which is grown in the southern great plains area. After the Illinois harvest, the United States spring wheat crop, the Canadian crop, and the European crops are harvested. Still later, in early winter, the southern hemisphere (chiefly Argentina and Australia) crops come on the market. The long period over which the world's wheat harvests are spread helps to dampen down seasonal increases in wheat prices.

Most Illinois wheat is sold at harvest time. Illinois farmers do not usually store their wheat crop, even though in recent years CCC loans have been available. They appear to believe that wheat is a difficult

Table 7.—Median Percent of Wheat Sold in Each Month by Illinois Farmers, 1908-1937 and 1938-1951 Crops*

	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1908-1937.....	33	24	9	6	4	4	4	4	3	3	3	2
1938-1951.....	67	11	4	3	2	2	2	2	2	2	2	1

* Data from Illinois Cooperative Crop Reporting Service.

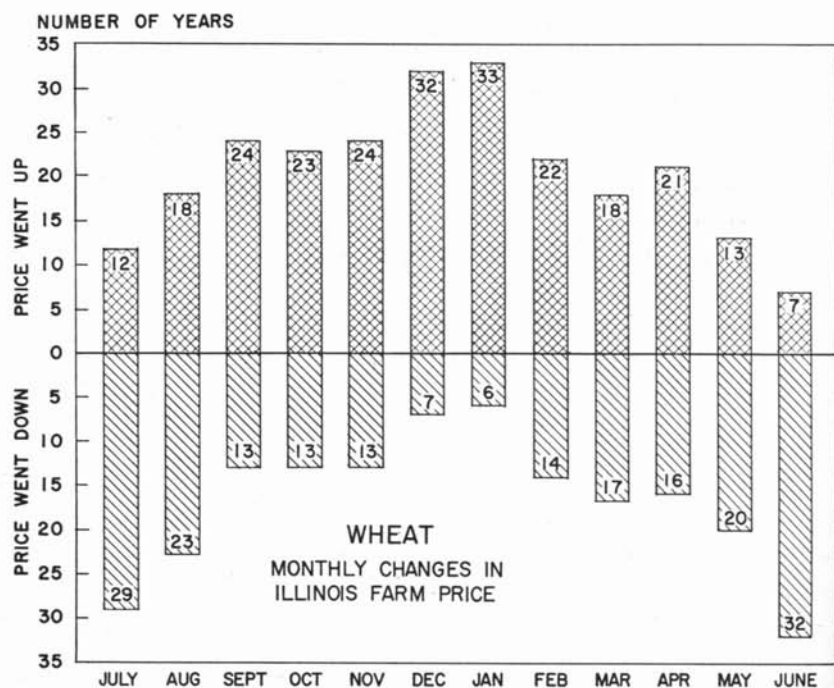
crop to store successfully as it can easily go out of condition. Also, wheat is a source of funds at a time when they are often needed, since it is the first crop harvested after the spring and early summer expenses have been incurred.

In recent years two-thirds of the Illinois wheat has been sold in July and nearly four-fifths by the end of August (Table 7). Only about one-tenth of the crop was sold after January 1. In the earlier years, 1908-1937, harvesting and threshing were spread over a longer period and the marketing was slower. Two-thirds of the crop was then sold in July, August, and September, and one-fifth after January 1.

Price has advanced moderately until April. From 1908 to 1951 the Illinois farm price of wheat more commonly went up than down, month by month, from August to April and declined more commonly from April to August (Table 8 and Fig. 3). Advances were particularly

Table 8. — Month-to-Month Changes in Mid-Month Illinois Farm Price of Wheat, 1908-1951 and 1945-1951 Crops

	1908-1951 crops			1945-1951 crops		
	Price up	Price down	No change	Price up	Price down	No change
	(number of years)					
July to August.....	18	23	3	2	4	1
August to September.....	24	13	7	5	1	1
September to October.....	23	13	8	5	1	1
October to November.....	24	13	7	6	0	1
November to December.....	32	7	5	6	0	1
December to January.....	33	6	5	3	3	1
January to February.....	22	14	8	3	3	1
February to March.....	18	17	9	4	3	0
March to April.....	21	16	7	4	2	1
April to May.....	13	20	11	1	5	1
May to June.....	7	32	5	1	6	0
June to July.....	12	29	3	3	3	1



From 1908 through 1951, December and January were the months when wheat prices were most likely to rise. Since the war, however, the price declined in January as often as it rose.

(Fig. 3)

common from November to January. In the very short period since the war, 1945-1951, the tendency to rise has been very strong from August to December. This probably reflects the effect of CCC loans, which tend to retard the marketing over the United States after the immediate harvesttime sales are completed, and so cause a rapid rise in price after harvest.

For the long period, 1908-1951, the median increase from July 15 to April 15 was 11.5 cents a bushel and from July 15 to January 15 it was 10.5 cents (Table 9). For the 1938-1951 period the median increase to April 15 was 15.5 cents and to December 15 was 11 cents a bushel.

During the 44-year period Illinois wheat prices, in both the July-April and July-January periods, actually declined or failed to increase in somewhat less than one-third of the years. These declines reflected changing conditions after harvest, such as a general deflationary situation or larger harvests in other parts of the world. In about half the years the price increased over 10 cents a bushel, and in about a fifth over 25 cents a bushel. Since 1938 decreases have been very rare, and the July-April spread has been more than 25 cents a bushel in over a fifth of the years.

Costs of carrying wheat are considerable. Assuming commercial

Table 9.—Distribution of Spreads in Wheat Prices from July to April and July to January, 1908-1951 and 1938-1951 Crops

	1908-1951 crops		1938-1951 crops	
	July to April	July to January	July to April	July to December
	(number of years)			
Increases of:				
Over 25 cents.....	9	8	3	2
21-25 cents.....	2	2	1	1
16-20 cents.....	6	3	3	2
11-15 cents.....	6	9	5	2
6-10 cents.....	6	4	0	6
1-5 cents.....	2	5	0	0
No change.....	1	1	1	0
Decreases of:				
1-5 cents.....	3	4	1	1
6-10 cents.....	3	3	0	0
11-15 cents.....	1	0	0	0
16-20 cents.....	3	3	0	0
21-25 cents.....	0	1	0	0
Over 25 cents.....	2	1	0	0
Median increase.....	11.5¢	10.5¢	15.5¢	11¢

storage at $\frac{1}{20}$ cent a bushel a day and \$2.00 wheat, we get the following:

	<i>July-April</i>	<i>July-December</i>
Interest at 5 percent.....	\$.075	\$.042
Storage at $\frac{1}{20}$ cent a day.....	.105	.075
Taxes.....	.030
Total.....	.210	.117

The taxes assume a \$1.50 assessment and a tax rate of \$2 per \$100. There will be no assessment for the wheat sold in December.

Farm storage involves the possibility of loss in quality, which cannot be reduced to a specific figure. There would also be costs for binning, some shrinkage through handling, and insurance. The actual cost of storing wheat on the farm might be higher or lower than the commercial rate used above, depending on the situation on a particular farm.

Considering the costs of storage and the probable rise in price during storage, two conclusions can be drawn:

1. Illinois farmers are probably justified in not holding wheat for a long period in the light of the modest increase in wheat prices from July to April and the cost of storage.

2. Short-term storage, say from July to December, is probably justified in years when the quality of the wheat makes it possible to do so without risk of developing damaged wheat. In recent years the median price increase from July to December has been close to the cost for storage during the period, and there will always be some years with more-than-average increases in price. Such storage will be rather safe as long as CCC loans make a decline in price in this period unlikely. Getting satisfactory storage space, however, is a problem for many growers.

WHEN TO MARKET OATS

The oats crop ranks fourth among the Illinois grain crops as a source of cash income. In 1949-50 sales of oats earned 2.7 cents out of each dollar of Illinois farm income.

Table 10.—Median Percent of Oats Sold in Each Month by Illinois Farmers, 1908-1937 and 1938-1950 Crops*

	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1908-1937.....	11	24	11	6	4	6	7	7	5	6	7	6
1938-1950.....	28	16	6	4	4	4	7	7	8	6	5	5

* Data from Illinois Cooperative Crop Reporting Service.

Sales of oats are heavy early in the season; from 1938 to 1951, 50 percent of the oats crop was sold in July, August, and September (Table 10). Sales of the rest of the crop were spread over the year, with only corn among the grain crops being more uniformly sold. In the 1908-1937 period the peak of sales came in August, but since then the peak has come in July, reflecting the change in the method of harvesting.

Between 1908 and 1951 the price of oats more often went up than down month by month from August to April, and more commonly declined from April through July (Table 11 and Fig. 4). Advances were most common from August to September, November to December,

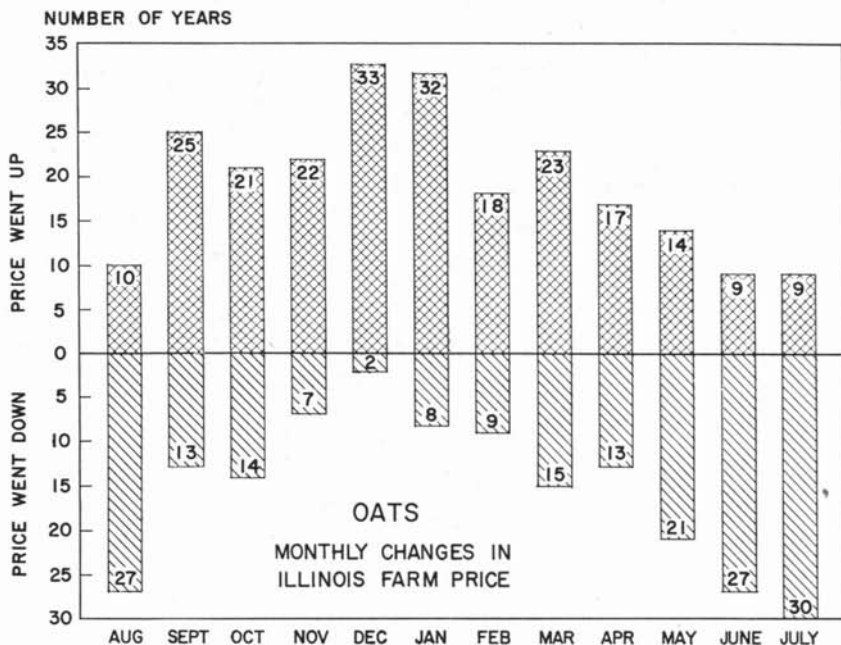
Table 11. — Month-to-Month Changes in Mid-Month Illinois Farm Price of Oats, 1908-1951 and 1945-1951 Crops

	1908-1951 crops			1945-1951 crops		
	Price up	Price down	No change	Price up	Price down	No change
	(number of years)					
July to August.....	10	27	7	2	5	0
August to September.....	25	13	6	7	0	0
September to October.....	21	14	9	5	1	1
October to November.....	22	7	15	5	2	0
November to December.....	33	2	9	6	0	1
December to January.....	32	8	4	3	4	0
January to February.....	18	9	17	1	3	3
February to March.....	23	15	6	6	0	1
March to April.....	17	13	14	3	2	2
April to May.....	14	21	9	3	4	0
May to June.....	9	27	8	2	4	1
June to July.....	9	30	4	1	4	2

and December to January. In the brief postwar period, 1945-1951, the pattern has been the same except that declines were more common than increases from December through February.

Sale price usually higher in July than in August. Oat prices have been lowest in August because the center of U. S. oat production lies north of Illinois and the peak of harvest comes at that time. This is after the bulk of the Illinois crop has been threshed and after the heaviest month of Illinois marketing has passed. By selling their crop early, Illinois farmers can thus miss part of the seasonal decline in price and at the same time avoid all storage costs.

In four of the years from 1938 through 1951 sales by July 15 would



During the 1908-1951 period oat prices were more likely to rise than fall from month to month until April and then to decline until after the peak of the harvest sales passed. (Fig. 4)

have avoided an August decline in price of 4 or more cents a bushel. During the fourteen years the changes in oat prices from July 15 to August 15 were:

Increases of:	
1-4 cents.....	2
No change.....	5
Decreases of:	
1-4 cents.....	4
5-8 cents.....	1
9-12 cents.....	1
13-16 cents.....	1
Median decrease.....	1 cent

Storing oats until April has usually paid. Oat prices have usually risen month by month from August 15 to April 15. The median increase for the period 1908-1951 was 8 cents a bushel. The changes were distributed, by years, as follows:

Increases of:

Over 25 cents.....	1
21-25 cents.....	4
16-20 cents.....	6
11-15 cents.....	7
9-10 cents.....	3
7-8 cents.....	2
5-6 cents.....	1
3-4 cents.....	5
1-2 cents.....	4
No change.....	2

Decreases of:

1-2 cents.....	5
3-4 cents.....	2
5-6 cents.....	1
Over 25 cents.....	1

Median increase.....8 cents

Beginning with 1938 we find a pattern of larger increases. This is due in part to the general inflationary trend and to the general practice of combining. Combined oats are often not as dry as oats threshed after being shocked, and so are more difficult to store. The August 15 to April 15 changes in the farm price of oats during this period were distributed as follows:

Increases of:

21-25 cents.....	2
16-20 cents.....	5
11-15 cents.....	2
6-10 cents.....	3
1-5 cents.....	1

Decreases of:

1-5 cents.....	1
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Median increase.....15.5 cents

In only two of the fourteen years was the increase less than 10 cents a bushel. The median increase of 15.5 cents a bushel should cover the cost of binning, interest, taxes, and insurance and also allow something for the use of a bin. (Allowance must be made for the decline from harvest to August 15 in interpreting these figures. The median decline from July 15 to August 15 was 1 cent a bushel, with much larger drops in some years.)

The increase probably would not be as great in a period of stable or falling prices. From 1938 to 1951 prices were generally rising. Judging by the longer 44-year period there would be nearly one chance in four of either an actual decline or no increase in price and about the same chance of an increase of only 1 to 8 cents.

Losses or only small increases are more common when the general price level is declining. Knowing the direction in which the price level is moving will help to avoid some of these years.

Most of the seasonal rise has occurred by January. The August-January spreads in the Illinois farm price of oats from 1938 to 1951 were distributed by years as follows:

Increase of:	
Over 25 cents.....	1
21-25 cents.....	1
16-20 cents.....	2
11-15 cents.....	5
6-10 cents.....	4
1-5 cents.....	1
Median increase.....	12.5 cents

The median increase of 12.5 cents a bushel would cover the cost of binning, interest, and insurance and allow something for the use of the bin. A January sale would have given a seller the advantage of the one really large increase in prices during this period: the increase of 55 cents a bushel between August, 1947, and January, 1948. Again, allowance must be made for the decline from harvest to August 15 in interpreting the above results.

Commercial storage of oats not usually profitable. The increases in price of oats after harvest are ordinarily enough to make on-farm storage worth while. They would not, however, make commercial storage very profitable.

Storage at a commercial rate of $\frac{1}{20}$ cent a day for the nine months from August to May would be 13.5 cents. This plus interest would exceed the median increase of 15.5 cents between August 15 and April 15 for the 1938-1951 crop years.

Storage from August 1 to February 1 would be 9 cents (180 days at $\frac{1}{20}$ cent a day). The median increase of 12.5 cents during this period would just about cover storage cost and interest on the value of the oats.