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Corn-Transportation

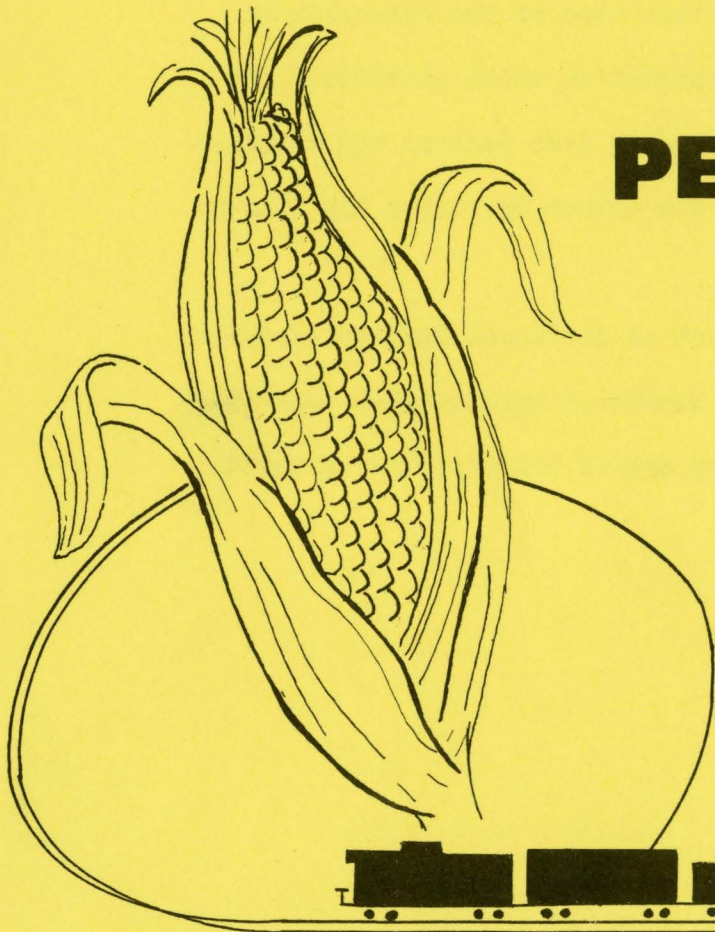
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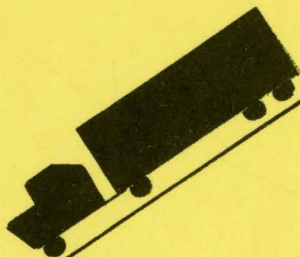
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transportation
of CORN
into
PENNSYLVANIA



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TRANSPORTATION OF CORN INTO PENNSYLVANIA

C. E. Trotter*

Considerable interest has developed in the feasibility of increased production of livestock in Pennsylvania. The State is a deficit feed-producing area so increased livestock production would require importation of greater supplies of feed grains, principally corn. This study was undertaken to appraise the cost of obtaining corn from other areas.

More specific questions were:

1. What were the principal sources of supply of corn shipped into the State?
2. Did source of supply cause differences in the price of corn delivered to mills in Pennsylvania?
3. Were differences in delivered prices related to method of transportation?

Procedure

In August 1959, the following questionnaire was mailed to all the feed mills listed in the Directory of Pennsylvania Millers and Feed Dealers, 1958. If a firm had several branches or sub-stations, only one questionnaire was sent to the main office.

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Questionnaire

Do you purchase corn from out of state? Yes _____ No _____

If corn is purchased from out of state:

Date of last shipment from out of state? _____

Source of the purchase? City _____ State _____

Cost delivered at your mill? _____ per bu. or _____ per cwt. or _____ per ton

Was it delivered in bulk (loose) _____ or bagged _____?

Grade or quality? _____ Whole kernel? _____ Cracked? _____

Means of transportation? Rail _____ Truck _____ Barge _____. If more than one means of transportation was used, indicate cities at which changes were made. _____

Name _____

Address _____

County _____

Shipments from Out-of-State

During September, October, and November of 1959, a 55 per cent return was received from the 1019 questionnaires mailed, table 1. The distribution of mailings among counties shows the concentration of mills in the southeastern part of the State where there is surplus grain and large populations of livestock and poultry, particularly in Lancaster and York counties. Interestingly, 56 per cent of the mills returning questionnaires reported they did not purchase corn from out-of-state sources. Included in this category were dealers who purchase no corn because they handle only commercial feed mixes and mills that dealt

exclusively with flour. Other mills indicated they obtained corn through a local broker or wholesaler who handled corn from an unidentified source.

Size of mill may influence method of purchase, price and method of transportation. It may be more convenient and economical for large mills to buy midwestern corn in the quantity and at the time they want it, delivered by rail. Small mills may be more likely to use local corn although data on size of mill was not included in the questionnaire.

Table 1. Distribution Among Counties of Corn Shipments Received from Out of State, by Method of Transportation.

County	Questionnaires		Shipments from out of state	Transportation	
	Mailed	Returned		Truck	Rail
Adams	32	11	3	3	-
Allegheny	11	3	2	1	-
Armstrong	12	4	2	1	1
Beaver	9	6	3	-	2
Bedford	13	12	7	5	1
Berks	41	19	6	2	3
Blair	12	7	2	2	-
Bradford	17	11	8	7	-
Bucks	19	17	1	-	1
Butler	22	10	7	6	-
Cambria	14	8	5	4	1
Cameron	1	-	-	-	-
Carbon	4	2	1	1	-
Centre	6	2	1	-	-
Chester	31	17	4	3	1
Clarion	9	4	3	3	-
Clearfield	12	4	2	-	2
Clinton	6	2	-	-	-
Columbia	24	15	3	1	1
Crawford	20	10	6	5	1
Cumberland	23	13	5	2	2
Dauphin	17	9	4	2	2
Delaware	6	5	1	1	-

Table 1. (continued)

	<u>Questionnaires</u>		Shipments from out of state	<u>Transportation</u>	
	Mailed	Returned		Truck	Rail
Elk	8	3	-	-	-
Erie	21	10	5	1	4
Fayette	9	3	1	-	-
Forest	2	1	-	-	-
Franklin	13	13	4	4	-
Fulton	2	2	-	-	-
Greene	4	2	2	1	1
Huntingdon	9	2	1	-	-
Indiana	14	4	1	1	-
Jefferson	10	8	3	3	-
Juniata	12	5	1	-	-
Lackawanna	16	9	5	-	5
Lancaster	78	52	17	15	2
Lawrence	14	9	6	5	-
Lebanon	22	13	3	2	1
Lehigh	16	7	1	-	1
Luzerne	21	6	3	-	3
Lycoming	18	11	-	-	-
McKean	5	4	4	3	1
Mercer	12	10	5	5	-
Mifflin	5	5	3	3	-
Monroe	6	3	1	1	-
Montgomery	11	6	3	2	1
Montour	5	2	-	-	-
Northampton	13	7	1	-	1
Northumberland	15	11	1	-	1
Perry	13	6	2	1	1
Philadelphia	5	2	-	-	-
Pike	4	1	-	-	-
Potter	12	7	5	4	1
Schuylkill	21	10	4	3	1
Snyder	14	8	5	5	-
Somerset	17	6	3	-	3
Sullivan	7	5	2	1	1
Susquehanna	23	14	6	3	3
Tioga	17	8	8	6	2
Union	13	7	2	1	1
Venango	7	4	1	1	-
Warren	6	4	4	2	2
Washington	21	10	8	5	3
Wayne	14	5	3	-	3
Westmoreland	26	18	12	7	5
Wyoming	10	7	7	3	4
York	67	38	6	1	5
Other		5	1		1
Total	1,019	564	227	138	76

Numerous mills among the 227 that reported a purchase from out-of-state noted that they did not do this on a regular basis. The poor State corn crop in 1957 spurred increased importations the first nine months of 1958, but the abundant crop in 1958 resulted in ample local supplies for many mills at the time this survey was made. Thirty firms reported their last shipment from out-of-state was in 1958; five in 1957.

It should be pointed out that the questionnaire was restricted to the "last shipment from out of state." Therefore, no conclusions could be drawn as to the frequency of such shipments or their volume.

Source of Supply

Over two-thirds of the shipments came from the corn belt states with 83 from Ohio, 55 from Indiana, 8 from Illinois and one from Iowa. Nearly all of the shipments into Erie, Crawford and Beaver counties originated in Ohio while practically all shipments into Mercer, Bedford Butler, and Cambria counties came from Indiana. Shipments from Ohio and Indiana were equally important in Lawrence, Washington and Westmoreland counties. Most of the shipments into Lancaster County were from Ohio.

New York state accounted for 24 per cent of the shipments and was almost the sole supplier for the northern-tier counties during the period studied. Nearly one-half of the shipments from New York originated in Buffalo.

A few shipments were received from New Jersey, Delaware and Maryland by mills in the southeastern corner of the state.

Method of Transportation

Approximately two-thirds of the shipments from out-of-state arrived by truck and one-third by rail. It was anticipated some corn might be moved

by barge down the Mississippi River then up the Ohio River into the Pittsburgh area, but no such shipments were reported. Personal correspondence with members of the milling industry prior to the publication of this report indicated corn was barged into Pittsburgh and shipped from there by truck.

Rail shipments were associated with areas served by "main line" tracks. For example, nearly all shipments arrived by rail in Erie, Lackawanna, Luzerne and York counties. However, movement by truck predominated in some counties along a "main line," such as Lancaster and Westmoreland. The ease of movement over the Pennsylvania Turnpike probably explains the incidence of truck receipts in these two counties, as well as Lawrence, Butler, and Franklin counties.

Prices - By Method of Transportation

One objective of this study was to determine if the method of transportation caused differences in the price of corn delivered to mills in Pennsylvania. To test for this, it was necessary to minimize the effect of price changes over time and to make comparisons among shipments of similar quality.

Price comparisons were restricted to shipments received within the period April 1 through September 15, 1959. The price of corn at Chicago was reasonably steady during this period, table 2. Except for one low quotation following the Fourth of July, the price of corn fluctuated within the narrow range of two or three cents per bushel.

During the April to September period prices were reported for 130 shipments, which averaged \$1.53 per bushel. The "average" prices

shown in figure 1 are for all shipments received in the given county, irrespective of grade or form. As expected, bulk, whole kernel shipments of corn predominated. However, numerous mills reported receiving whole and cracked corn in bags, particularly in the northern-tier counties. Some mills indicated that they had no cracking equipment of their own and the cracked corn was used in poultry grain mixtures. Most mills received number 2 yellow corn, but a few specified grades 1 or 3.

Table 2. Weekly Price Quotations, Number 2 Yellow Corn, Selected Markets, 1959.

	Chicago	Toledo	St. Louis	Minneapolis
----- dollars per bushel -----				
Jan. 8	\$1.20 - \$1.21	\$1.16 - \$1.17	\$1.17 - \$1.23	\$1.04 - \$1.05
15	1.18 - 1.19	1.17 - 1.18	1.16 - 1.22	1.04 - 1.05
22	1.21 - 1.22	1.18 - 1.19	1.17 - 1.23	1.06 - 1.07
29	1.19 - 1.20	1.18 - 1.19	1.16 - 1.23	1.04 - 1.05
Feb. 5	1.17 - 1.19	1.16 - 1.17	1.16 - 1.22	1.02 - 1.04
12	1.19 - 1.20	1.17 - 1.18	1.18 - 1.23	1.05 - 1.06
19	1.20 - 1.20	1.17 - 1.18	1.18 - 1.23	1.05 - 1.06
26	1.19 - 1.21	1.17 - 1.18	1.18 - 1.23	1.04 - 1.06
Mar. 5	1.21 - 1.22	1.19 - 1.20	1.17 - 1.23	1.05 - 1.07
12	1.23 - 1.24	1.20 - 1.21	1.19 - 1.26	1.07 - 1.08
19	1.23 - 1.25	1.21 - 1.22	1.19 - 1.26	1.08 - 1.09
26	1.24 - 1.25	1.22 - 1.23	1.20 - 1.26	1.10 - 1.11
Apr. 2	1.29 - 1.30	1.27 - 1.28	1.26 - 1.31	1.15 - 1.16
9	1.30 - 1.32	1.27 - 1.28	1.27 - 1.34	1.17 - 1.17
16	1.30 - 1.31	1.28 - 1.29	1.27 - 1.34	1.17 - 1.18
23	1.29 - 1.30	1.28 - 1.29	1.29 - 1.35	1.18 - 1.18
30	1.28 - 1.29	1.26 - 1.27	1.27 - 1.35	1.16 - 1.17
May 7	1.28 - 1.29	1.25 - 1.27	1.27 - 1.34	1.17 - 1.17
14	1.30 - 1.31	1.27 - 1.28	1.28 - 1.36	1.18 - 1.19
21	1.31 - 1.32	1.28 - 1.29	1.29 - 1.37	1.20 - 1.20
28	1.29 - 1.30	1.26 - 1.27	1.28 - 1.35	1.18
June 4	1.30 - 1.31	1.28 - 1.29	1.29 - 1.35	1.19
11	1.31 - 1.32	1.28 - 1.29	1.29 - 1.36	1.19 - 1.20
18	1.31 - 1.32	1.27 - 1.28	1.30 - 1.37	1.20 - 1.21
25	1.31	1.26 - 1.27	1.26 - 1.37	1.17 - 1.18

Table 2. (continued)

	Chicago	Toledo	St. Louis	Minneapolis
----- dollars per bushel -----				
July 1	\$1.29 - \$1.30	\$1.26	\$1.27 - \$1.35	\$1.17 - \$1.18
9	1.25	- -	1.24 - 1.34	1.14 - 1.15
16	1.29 - 1.30	1.25 - 1.26	1.28 - 1.36	1.17 - 1.18
23	1.28 - 1.29	1.26 - 1.27	1.30 - 1.36	1.18 - 1.19
30	1.28 - 1.29	1.26 - 1.27	1.26 - 1.35	1.18 - 1.19
Aug. 6	1.28 - 1.29	1.26 - 1.27	1.27 - 1.35	1.19 - 1.20
13	1.27 - 1.28	1.23 - 1.24	1.24 - 1.34	1.18 - 1.19
20	1.29 - 1.30	1.22 - 1.23	1.24 - 1.35	1.16
27	1.26 - 1.27	1.18 - 1.19	1.22 - 1.32	1.12 - 1.13
Sept. 3	1.30	1.21 - 1.22	1.25 - 1.35	1.14 - 1.15
10	1.28 - 1.29	1.19 - 1.20	1.24 - 1.32	1.12 - 1.13
17	1.19 - 1.20	1.15 - 1.16	1.13 - 1.21	1.08 - 1.11
24	1.16	1.06 - 1.07	1.09	1.04 - 1.05
Oct. 1	1.19 - 1.20	1.09 - 1.10	1.12 - 1.19	1.06 - 1.07
8	1.21	1.10 - 1.11	1.17 - 1.24	1.06 - 1.13
15	1.10 - 1.11	1.04 - 1.05	1.10 - 1.17	1.03 - 1.04
22	1.09 - 1.10	1.02 - 1.03	1.06 - 1.13	1.01 - 1.04
29	1.10 - 1.11	1.03 - 1.04	1.06 - 1.15	1.00 - 1.03
Nov. 5	1.13	1.07 - 1.08	1.10 - 1.17	1.04 - 1.06
12	1.13 - 1.14	1.08 - 1.09	1.11 - 1.18	1.03 - 1.05
19	1.13 - 1.14	1.09 - 1.10	1.10 - 1.19	1.03 - 1.05
25	1.12	1.08 - 1.09	1.09 - 1.18	1.02 - 1.03
Dec. 3	1.11 - 1.12	1.10 - 1.11	1.08 - 1.18	1.01 - 1.02
10	1.11 - 1.12	1.09 - 1.10	1.08 - 1.18	1.02 - 1.03
17	1.11 - 1.12	1.08 - 1.09	1.08 - 1.16	1.01 - 1.02
23	1.13 - 1.14	1.10 - 1.11	1.11 - 1.18	1.03 - 1.04
30	1.16 - 1.17	1.12 - 1.13	1.16 - 1.22	1.04 - 1.05
Average				
April 1 thru				
Sept. 15, 1959	\$1.29	\$1.26	\$1.31	\$1.06

Source: Grain Market News, Weekly Summary and Statistics, Grain Division, Agricultural Marketing Service, USDA

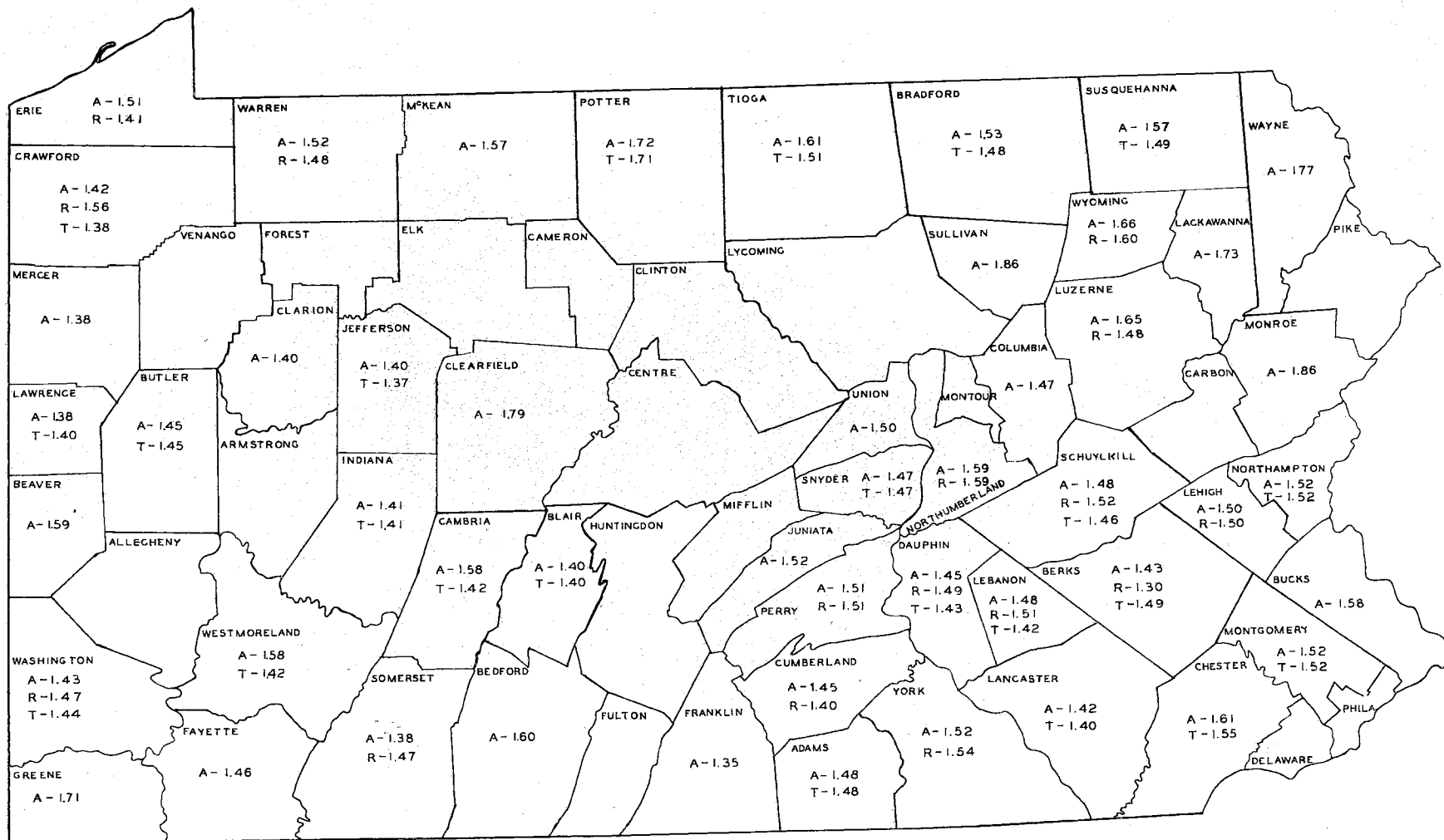
The "rail" and "truck" prices shown in figure 1 are limited to bulk (loose) shipments of number 2 whole kernel corn. Unfortunately,

many replies did not specify grade and form of the shipment reported, so comparisons were limited to 17 rail and 42 truck shipments. The price at the mill of the rail shipments averaged \$1.47 per bushel while truck shipments averaged \$1.45. Shipments that employed both rail and truck were excluded from this comparison.

These data show a price advantage to truck shipments. The difference is slightly over two cents per bushel based on the average of all truck and rail quotations. The rail average is biased downward by one unusually low quotation of \$1.30 per bushel, while the next lowest quotation is \$1.40. If the quotation of \$1.30 is discounted, the rail average would be \$1.50 or over five cents higher than the average for truck shipments. The lowest quotation for truck shipments also was \$1.30, but 17 per cent of the quotations were in the "30's." Another indication of the truck advantage is that 55 per cent of the quotations for truck shipments were in the "40's" while only 41 per cent of the rail quotations were in this interval.

Where comparisons can be made within counties the difference favoring trucks is: Crawford - 18¢; Dauphin - 6¢; Lebanon - 9¢; Schuylkill - 6¢; and Washington - 3¢. Only in Berks county, where a rail shipment was reported at \$1.30 per bushel, did the comparison favor rail over truck.

The number of observations are so few that great reliance cannot be placed on these results. Chance variation in the purchase price at the source of supply could account for a major portion of the price differences between the two methods of transportation. Also, some replies might have reported purchase price at source of supply and not "cost delivered at your mill" as requested in the questionnaire. However, in checking these results



A = Average all shipments R = Rail T = Truck

Figure 1. Price of Corn Shipments Received from April 1 through September 15, 1959, by method of Transportation.
(Dollars per Bushel)

with some members of the milling industry, they reported truck shipments were generally about five cents per bushel cheaper than rail.

Corn is an agricultural commodity that does not fall under ICC rates when moved by truck or water carrier. Truckers often make price concessions so that they can haul a pay load both ways. For example, one concern trucks steel products to Indiana and brings corn back to Pennsylvania. Perhaps this helps explain why 92 per cent of the shipments originating in Indiana moved by truck while 45 per cent of the shipments from Ohio were by rail. Conversations with members of the trucking industry indicated they prefer flexibility in delivery date when hauling corn on a return trip. If corn shipments increased and scheduling became a problem, it might not be possible to haul a pay load both ways and corn transportation costs would increase.

Even though the initial cost of corn may be somewhat higher, rail receipts may result in cost advantages in the distribution of products of mills that process large quantities of prepared feeds and distribute them over wide areas. A "through" rate can be obtained on the proportion of the prepared feeds made up of grains received by rail, while the entire shipment would move at a higher rate if grains were delivered by truck.

Corn prices tended to be considerably higher in the northern-tier counties. Freight movements by water usually are cheaper than by truck or rail.^{1/} Apparently any savings realized by shipping corn over the Great Lakes into Buffalo, New York, are not reflected in the price of corn at mills in northern Pennsylvania. One half of the shipments to these mills originated at Buffalo. The fact that mills in this area received much of their corn bagged and cracked accounted for some of the price

^{1/} Transportation of Poultry Feed Ingredients From the North Central States, W.H.Thompson, South Dakota State College, Bul. 485, May 1960, p. 4.

difference. However, the service of bagging and cracking seems to be expensive. Ten rail shipments of bagged corn averaged \$1.75 per bushel while two bulk shipments moving by rail averaged \$1.54. Ten bulk shipments delivered by truck averaged \$1.51 per bushel. All these shipments originated in New York so source of supply was not a factor causing variation in price.

A price difference of 21 cents per bushel is equivalent to 38 cents per 100 pounds, seemingly a high charge for bagging. In a few of the individual counties, differences as great as 60 cents were reported. Also, in these same counties, a few shipments originating in states other than New York were reported at \$1.45 per bushel. Surprisingly, the limited number of observations showed no distinct price differences between whole kernel and cracked corn shipped in bags.

It appears that mills in the northern-tier counties could well afford to investigate alternative sources of supply and the feasibility of obtaining corn in bulk rather than bagged.

Prices - By Source of Supply

To test the effect of source of supply on the price of corn, comparisons were made between truck receipts from Ohio and Indiana. New York was the only other state from which an appreciable number of shipments were received, and most of those shipments were in bags rather than bulk.

Thirteen shipments from Indiana averaged \$1.43 per bushel while 15 shipments from Ohio averaged \$1.44. Apparently the destination within Pennsylvania influenced the price. Eleven shipments from Indiana into the western half of the state averaged \$1.42 while four shipments into the same

area from Ohio averaged \$1.39. In the eastern half of the state two shipments from Indiana averaged \$1.50 per bushel while 11 shipments from Ohio averaged \$1.45. Indiana shipments were clustered in the southwestern part of the state while shipments from Ohio were predominantly into the southeastern corner. Within each portion of the state, the number of shipments from each source of supply were so disproportionate that it was difficult to draw any conclusions with respect to the relationship of source of supply and price of receipts at Pennsylvania mills. In general it seems that transportation costs cancel out any difference in price that might prevail at the point of purchase, with some tendency for shipments from Ohio to be slightly lower priced.

Six rail shipments originating in Ohio and terminating in southeastern Pennsylvania averaged \$1.51 per bushel. This was six cents per bushel higher than truck receipts in that area, about the same differential as shown in the aggregate data presented previously.

Prices - By Geographic Areas

Earlier studies indicated that the lowest farm price of corn centered in the West North Central States with prices increasing progressively toward the east and west coast.

During personal interviews with brokers and wholesalers in Philadelphia, it was pointed out that their method of pricing corn for delivery in the Philadelphia area from any source west of Pittsburgh was the Chicago price per bushel plus 29 $\frac{5}{8}$ cents, the freight rate for corn from Chicago to Philadelphia. It was estimated the same price relationship would hold for corn received directly by feed mills. It was assumed shipping charges by rail or by truck would be comparable due to competition. During the

period April 1 through September 15, 1959, number 2 yellow corn averaged \$1.29 per bushel on the Chicago market. Thus the predicted price for corn delivered to the door of Pennsylvania mills during this same period was \$1.59 per bushel.

Surprisingly, whole kernel number 2 corn delivered in bulk averaged \$1.47 per bushel or about 12 cents lower than the expected price. Apparently the Chicago market is not the base market that directly influences prices in Pennsylvania. Table 2 indicates the price of number 2 corn at Toledo, Ohio, was about three cents lower than at Chicago. It appears that the prices at Pennsylvania mills were the Toledo quotation plus 20 to 22 cents, the actual rate quoted in interviews with several trucking concerns. However, price changes on the Toledo market are similar to those on the Chicago market. The situation in 1959 does not seem unique. Table 3 indicates that since 1945 the price of corn in Pennsylvania is tied more closely to the price of corn in Ohio than any other of the major corn producing states. The variability of the difference in the annual average farm price of corn in Pennsylvania and Ohio is less than any of the other comparisons.

Price Patterns Changing

Apparently the pattern of corn prices among states has changed since the World War II period. The lowest price of corn still is centered in the West North Central States. The price is noticeably higher in Illinois, but in a majority of the years since 1945, prices in Indiana and Ohio were the same as or lower than the prices in Illinois rather than higher as in earlier years.

Changes in the location of livestock and poultry producing areas and accompanying changes in corn shipments have changed the relationship of corn prices among states. Kansas, Nebraska, Iowa and Minnesota originated almost 60 per cent of the grain shipped into the southeastern states in 1957; Illinois, Iowa and Missouri were the most important shippers into

Table 3. Annual Average Price of Corn Received by Farmers in Selected States, and Comparisons with Pennsylvania Prices, 1945 through 1960.*

								Price Differences, Pennsylvania Vs.			
	Pa.	Ohio	Ind.	Ill.	Minn.	Iowa	N. Dak.	Ohio	Ind.	Ill.	Iowa
	dollars per bushel										
1945	\$1.34	\$1.13	\$1.09	\$1.07	\$.93	\$.98	\$.90	\$.21	\$.27	\$.25	\$.36
1946	1.63	1.42	1.37	1.39	1.27	1.30	1.26	.21	.24	.26	.33
1947	1.97	1.91	1.88	1.90	1.75	1.84	1.74	.06	.07	.09	.13
1948	2.07	1.88	1.84	1.89	1.78	1.85	1.71	.19	.18	.23	.22
1949	1.33	1.18	1.15	1.19	1.08	1.11	1.01	.15	.14	.18	.22
1950	1.48	1.38	1.35	1.35	1.22	1.28	1.17	.10	.13	.13	.20
1951	1.80	1.70	1.66	1.67	1.49	1.58	1.44	.10	.13	.14	.22
1952	1.84	1.69	1.64	1.65	1.42	1.56	1.41	.15	.19	.20	.28
1953	1.61	1.45	1.42	1.44	1.29	1.37	1.26	.16	.17	.19	.24
1954	1.66	1.47	1.44	1.47	1.33	1.42	1.25	.19	.19	.22	.24
1955	1.45	1.24	1.24	1.28	1.20	1.31	1.11	.21	.17	.21	.14
1956	1.49	1.32	1.29	1.30	1.23	1.31	1.13	.17	.19	.20	.18
1957	1.41	1.20	1.10	1.16	1.00	1.07	.96	.21	.25	.31	.34
1958	1.41	1.18	1.11	1.11	.90	.97	.87	.23	.30	.30	.44
1959	1.27	1.10	1.08	1.09	.95	1.00	.91	.17	.19	.18	.27
1960	1.25	1.02	1.02	1.03	.87	.92	.89	.23	.23	.22	.33

* Annual prices are simple averages of monthly quotations.

Source: Crops and Markets, Agricultural Marketing Service, U.S.D.A.

Arkansas and Missouri.^{2/} It is reported informally by feed dealers that considerable corn moves out of the Chicago market for export, but little corn is exported from the Indiana and Ohio areas. Export rates to Eastern seaports are more favorable from areas west of Indiana. Apparently movement of feed grains south over the T.V.A. system, plus export sales, has bid up the price of corn on the Chicago market to higher level than in the adjacent states to the East. Some of the year to year variation in price among states undoubtedly results from differences in the size and quality of the corn crop, but the price relationships are too consistent to result entirely from annual differences in weather.

Theoretically, the highest price of corn in Pennsylvania should be the minimum price of midwest corn plus transportation charges. Differences between the annual average price of corn in Pennsylvania and Ohio ranged from 6 cents to 23 cents, table 3. These data indicate price differences among states are not reliable measures of transfer costs between those states in any given year. Part of the price variation results from year-to-year differences in the size and quality of the corn crop in the various areas. Except for 1945 and 1946 when there were transportation restrictions due to world conflict, the price differences shown in table 3 have tended to widen over time. Insofar as transportation charges influence average price differences in the long run, this implies that transfer costs between states have increased during this period.

Pennsylvania's agriculture is not geared to commercial corn production, so that a bumper corn crop frequently is in excess of storage capacity.

^{2/} Ibid., pp. 6, 7.

When this happens the local price drops lower than normally expected for several months following harvest. Storage capacity, therefore, affects the pattern of seasonal prices of corn in Pennsylvania. For example, since 1949 the annual average change in price from low to high was 24 cents per bushel. During the short crop year in 1957 the seasonal change was only 9 cents while the large crop in 1958 was accompanied by a price swing of 37 cents per bushel. In the last 12 years the low price has occurred eight times in November and three times in January. The high price period is more variable, occurring four times in September, twice in August and once in June. Twice the price in December or January was as high as in August and September. The price pattern of Ohio corn was similar to that of Pennsylvania except that the seasonal variation was 28 cents per bushel and the high price period occurred more consistently in August and September.

As a result of this situation, during those years when the local corn crop is good, limited quantities of corn can be purchased in Pennsylvania at a price considerably below midwestern prices plus transfer costs.

In the long run corn prices in Pennsylvania will be influenced by prices of midwest corn plus transportation costs, and this study indicates Pennsylvania prices are tied most closely to prices of Ohio corn as represented by the Toledo market.

Conclusions

Results of a survey of feed mills in Pennsylvania indicate that nearly two-third of the corn shipments into the state originated in Ohio and Indiana and approximately one-fourth came from New York. Two-thirds

of those shipments moved by truck, and shipments by truck were cheaper than shipments by rail. Regular importation of corn is restricted to a small proportion of the feed mills. During this study Toledo, Ohio, seemed to be the base market determining the price of corn shipped into Pennsylvania rather than Chicago, Illinois.

The marketing system for corn in Pennsylvania seems to be quite variable and somewhat disorganized. Within the same time period, adjacent counties obtained corn from divergent sources and at prices that differed as much as 20 cents per bushel, with 5 to 10 cents differences the rule rather than the exception. This suggests that many grain handlers could make a sizeable saving on the purchase price of corn through more careful consideration of alternative sources of supply and method of transportation. A coordinated, cooperative effort by groups of handlers in purchasing, transporting and cracking corn might further improve their position.

