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Price, Supply, and Disposal of Wheat in the United States and North Dakota

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PRICE, SUPPLY, AND DISPOSAL OF WHEAT IN THE UNITED STATES AND NORTH DAKOTA

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"

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INTRODUCTION

Wheat is the center around which the life of the North Dakota citizen revolves. He arises to scan the sky for signs favorable or unfavorable to wheat. He goes to bed with concern for the present condition of the wheat crop. North Dakota leads the United States in the per cent of its acreage planted to wheat, with 18 per cent of its land area so planted.[1] With an average annual yield of 94 million bushels for the period from 1911 to 1935, North Dakota shares with Kansas the leadership in the quantity of wheat produced.(a) North Dakota is a one industry state; that industry is agriculture; and that industry is dominated by wheat.

It is small wonder that every North Dakotan finds himself in a world dominated by wheat. The merchant looks to the wheat crop to produce the buying power for his goods; the professional men's success rests on the wheat crop; and upon the wheat crop rests the public servant's ability to receive his pay in money rather than tax anticipation warrants of doubtful negotiability. Not to be forgotten is the lowly transient worker who looks to the North Dakota harvest for his "stake."

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1. Department of Agriculture, Yearbook, 1922, p. 594.

(a). Table IX, p. 56.

PART I

SUPPLY AND DISPOSAL OF WHEAT IN THE UNITED STATES

CHAPTER I

PURPOSE OF THE STUDY

What is the nature of this industry which plays such an important part in the life of North Dakota? What happens in the world of wheat which will affect the welfare of the grower? There is no lack of opinion about the right and wrong of what happens. The farmer complains that "they" fix things so that he cannot make any money. He insists that the producers in other areas get a better price for their product. The politician comes to the farmer every four years with rosy promises of what high tariffs are doing to 'protect our farmers from cheap imported wheat'. Farmer and consumer grumble at the fortunes made in the operations of the grain market. These agencies insist that they render a service to the public in stabilizing prices. "To hold or not to hold" is debated with characteristic abundance of heat and lack of light.

The crash of prices during the depression, followed by the manipulations of the Agricultural Adjustment Administration during the New Deal, has added to the heat but has not contributed a great deal of light. Much is being said about "Scarcity Economy", "National Self-Sufficiency", The More Abundant Life", and "Economy of Abundance". In all this welter of discussion few have taken the trouble to examine the

facts. Perhaps the most paradoxical view is that which excoriates the New Deal for its alleged scarcity economics. This view comes from those spokesmen of the status quo who have always practiced scarcity economy in large industries. The refined essence of this type of thinking was expressed in the fall of 1936 when Alfred M. Landon, then candidate for President, took occasion at Detroit to compliment Henry Ford for the contrast of his production policies with the scarcity economy of the New Deal. In contradiction of this praise Mr. Ford never built a car unless he was sure of a buyer. In fairness then, why should the farmers be criticized for attempting to apply "production for market" policies to their industry?

The purpose of this thesis is not to apologize for or criticize the New Deal, the Old Deal, or any other "Deal." It is an examination of the facts with the purpose of answering some of the more important questions that arise. The production, import, disposal, and price movements of wheat during the 25 year period from 1911 to 1935 inclusive are examined to discover trends that might point the way to future policies.

Part III of the study is a brief examination of the developments in the wheat industry of North Dakota for the same period.

Answers to the following questions are sought.

1. What is the normal production of wheat in the Unites States?

2. What is the normal consumption of wheat in the United States?
3. Is the consumption of wheat responsive to changes in the general economic well-being of the country?
4. Is the consumption of wheat responsive to changes in price?
5. Has there been any trend in the consumption of wheat in the last 25 years?
6. Has our export trade been a stabilizing influence in absorbing the variations in the production of wheat?
7. What is the normal carry-over?
8. Have there been any important variations in the carry-over?
9. How have the United States prices compared with those of other marketing centers, i.e.; Winnipeg and London?
10. Have these prices shown anything of the effect of our tariff policies on domestic prices?
11. Have there been any significant price differentials during the Agricultural Adjustment Administration operations?
12. Would seasonal price changes warrant changes in the marketing practices of farmers?
13. What have been the trends of the wheat industry in North Dakota?

From the answers to these questions the writer will attempt to set up the basis for a sound production-consumption program for the United States wheat growers.

CHAPTER II

METHOD OF THIS STUDY

The essential method of this study is the analysis of pertinent statistics in an effort to determine relationships. The statistics used are taken from the statistics of the Department of Agriculture which have been published in the Yearbooks between 1911 and 1935; in the Abstract of Statistics of 1936; and in the Department of Commerce, "Abstract of Statistics for the United States," 1936 edition. These publications contain an abundance of statistics but carry very little interpretive material. The method of this study is the interpretation of the data.

The first step is the setting up in Table I of the figures by years for the 25 year period from 1911 to 1935 inclusive for the following factors: production in bushels; weighted average price per bushel; farm value of the crop; exports; imports; amount used for seed; amount fed to livestock; amount consumed for domestic human food; and annual carry-over at the end of each year.

The next step is to determine which of these factors are constant and which are variable, and to determine the significance of these factors to the problem. From the standpoint of practical agriculture the problem is one of price. What agriculture wants to know is, "What can be done to assure a reasonable price from year to year?" The traditional plaint of the wheat grower is that when he has a

TABLE I. PRODUCTION, PRICE, FARM VALUE OF CROP, EXPORTS, IMPORTS, USE FOR SEED, USE FOR LIVESTOCK FEED, USE FOR DOMESTIC HUMAN FOOD, AN ANNUAL CARRY-OVER OF WHEAT IN THE UNITED STATES FROM 1911 to 1935

Year	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1911	618.2	86.9	537.1	81.9	3.4	79.0	25.0	455.0	78.0
1912	730.0	80.7	588.8	145.2	1.3	78.0	40.0	457.0	91.0
1913	751.1	79.4	596.0	148.8	2.4	82.0	73.0	480.0	76.0
1914	897.5	97,4	874.0	335.7	.7	93.0	30.0	458.0	55.0
1915	1008.6	96.1	968.8	246.2	7.3	85.0	77.0	520.0	163.0
1916	634.6	143.4	910.1	206.8	25.0	88.0	25.0	460.0	48.0
1917	619.8	204.7	1268.9	132.6	31.2	97.0	14.0	455.0	17.0
1918	904.1	205.0	1853.1	287.4	11.3	98.0	44.0	460.0	76.6
1919	952.1	216.3	2059.4	222.0	5.5	90.9	36.6	536.8	144.9
1920	843.3	182.6	1539.6	369.3	57.7	89.3	20.6	456.2	126.8
1921	819.0	103.0	843.5	282.6	17.4	88.3	32.7	442.1	114.3
1922	846.6	96.6	817.9	224.9	20.0	85.1	49.4	481.6	137.8
1923	759.5	92.6	709.3	159.9	28.0	73.5	66.9	476.8	144.4
1924	840.1	124.7	1047.7	260.8	6.2	81.3	55.9	474.9	114.8
1925	669.1	143.7	961.8	108.0	15.7	79.5	28.2	475.8	104.9
1926	833.5	121.7	1014.6	219.2	13.3	85.1	34.4	487.6	122.3
1927	874.7	119.0	1041.2	206.3	15.7	91.4	44.5	544.0	123.9
1928	913.0	99.8	911.1	163.7	21.4	84.6	55.1	505.0	246.7
1929	822.2	103.6	851.8	153.2	13.0	83.9	59.2	491.5	291.0
1930	889.7	67.1	596.7	131.5	19.0	81.1	157.5	513.7	326.0
1931	932.2	39.0	363.1	135.8	12.9	80.1	171.3	495.7	384.6
1932	745.8	38.0	283.8	41.2	9.4	83.6	122.5	495.5	393.4
1933	528.9	74.1	391.8	37.2	11.5	71.7	69.6	466.7	286.2
1934	526.4	84.7	446.4	21.5	25.1	75.5	81.4	475.8	152.0
1935	623.4	83.8	522.4	15.9	46.7	82.0	97.5	474.0	150.4

(1) Total annual production in millions of bushels
(2) Weighted average price per bushel in cents
(3) Farm value of crop in millions of dollars
(4) Exports in millions of bushels
(5) Imports in millions of bushels
(6) Use of wheat for seed in millions of bushels
(7) Use of wheat for livestock feed in millions of bushels
(8) Use of wheat for domestic human food
(9) Annual carry-over at end of season in millions of bushels

Source:--Column 1: Yearbook of Agriculture, 1935. p. 350 (except 1935 and 1934). Column (2); Ibid, p. 350. Column (3) Ibid, p. 350. Column (4) Ibid, p. 350. Column (5) Ibid, p. 350. Column (6): Yearbook of Agriculture, 1922, p. 612 (1911-1918) Yearbook of Agriculture, 1935, p. 363 (1919-1934). Column (7): Ibid, p. 359 (1919-1934) Interpolated(1911-1918). Column (8): Ibid, 1922, p. 612 (1911-1918); Ibid, 1935, pp. 363, calculated by deducting column (7) from disappearance for food, feed and loss. Column (9) Ibid,1922, p. 612 (1911-1918); Ibid, 1935, p. 363 (1919-1934).

crop the price is low, and when the price is good he has no crop. This complaint, as might be expected, comes especially from the producers in the marginal areas where the irregular crop is one of the chief factors in the annual variations of production.

Fundamental to the interpretation of the data of Table I [a] is the establishment of a basis of comparison. In this study two sets of graphs are presented. The first set is a pair of composite graphs showing the components of the annual supply and the annual disposal. These graphs are complementary to each other. They are broken line graphs of the composite summation type.

The second group of graphs in Part I presents comparisons of the variations in the variable factors from year to year. In this part of the study it is necessary to establish a basis for the comparison of the data dealing with the various factors. The percentage variation from norms is an easily understood method of interpretation. In calculating these variations it is necessary to establish norms. The writer does not feel that there is any valid reason for assuming that a certain period of years is necessarily normal. On the other hand it seems reasonable that during a 25 year period there will be a group of years showing median quantities which may be taken as

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(a). 1935 data from Department of Commerce, Abstract of Statistics, Col. (1) (2) (3), p. 632; (4) (4) (8) (9), p. 666. 1936 ed.

normal years. An average of such quantities may then be assumed to be the norm. The use of this central-average is the basis of the comparison graphs.

In establishing the normal figure for production, class intervals of fifty million bushels are used. The production for each year is tallied in its class interval and the average of those quantities in the central group of class intervals is taken as the normal.

Class interval (million bushels)	Tally	Summation of Central Quantities (a)
451-500	x	618.2
501-550	x	730.0
551-600		751.1
601-650	xxxx	897.5
651-700	x	634.6
701-750	xx	619.8
751-800	xx	904.1
801-850	xxxxxx	843.3
851-900	xxx	819.0
901-950	xxx	846.6
951-1000	x	759.5
1001-1050	x	840.1
		669.1
		833.5
	S/N	874.7
		913.0
$\frac{16567.4}{21}$ =	788.9	822.2
		889.7
		932.2
		745.8
		623.4
		16567.4

Thus the central average of 788.9 million bushels per year is the norm for the annual wheat production in the United States. The use of this norm eliminates the assumption of an arbitrary normal period of years; eliminates the distorting effect of extreme deviations from the norm; and makes possible

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(a) Source: Table I, column (1), p.

the expression of all variations in per cent of variation from normal. Necessarily this is the percentage variation of each category within itself, and is not a quantitative comparison of the factors with each other.

The formula for the calculation of the annual per cent of variation from the normal is V/C = P, where V represents the annual quantity, C represents the norm, and P equals the percentage variation from the norm.

The procedure here described is used in the preparation of the figures for all the data in the comparison graphs.

CHAPTER III

WHEAT SUPPLY FROM 1911 TO 1935

The wheat supply in any year is composed of three factors: carry-over from the previous crop year; crop for the current year; and imported wheat. Table II is a summary of these supply factors for the period from 1911 to 1935.

TABLE II. WHEAT SUPPLY FACTORS IN THE UNITED STATES FROM 1911 TO 1935 IN MILLIONS OF BUSHELS

Year	(1)	(2)	(3)	(4)
1911	92.0	618.2	3.4	713.6
1912	78.0	730.0	1.3	809.3
1913	91.0	751.1	2.4	844.5
1914	76.0	897.5	.7	974.2
1915	55.0	1008.6	7.3	1070.9
1916	163.0	634.6	25.0	822.6
1917	48.0	619.8	31.2	699.6
1918	17.0	904.1	11.3	932.4
1919	76.6	952.1	5.5	1034.3
1920	144.9	843.3	57.7	1045.9
1921	126.8	819.0	17.4	963.2
1922	114.3	846.6	20.0	980.9
1923	137.8	759.5	28.0	924.6
1924	144.4	840.1	6.2	980.7
1925	114.8	669.1	15.7	799.6
1926	104.9	833.5	13.3	951.7
1927	122.3	874.7	15.7	1012.7
1928	123.9	913.0	21.4	1058.3
1929	246.7	822.2	13.0	1081.9
1930	291.0	889.7	19.0	1199.7
1931	326.0	932.2	12.9	1271.7
1932	384.6	745.8	9.4	1139.8
1933	393.4	528.9	11.5	933.8
1934	286.2	526.4	25.1	807.8
1935	152.0	623.4	46.7	822.1

(1) Carry-over from previous crop year in millions of bushels
(2) Current crop in millions of bushels
(3) Imports in millions of bushels
(4) Total supply -- sum of first three columns

Source:-- Corresponding columns in Table I except column (4) which is sum of first three columns.

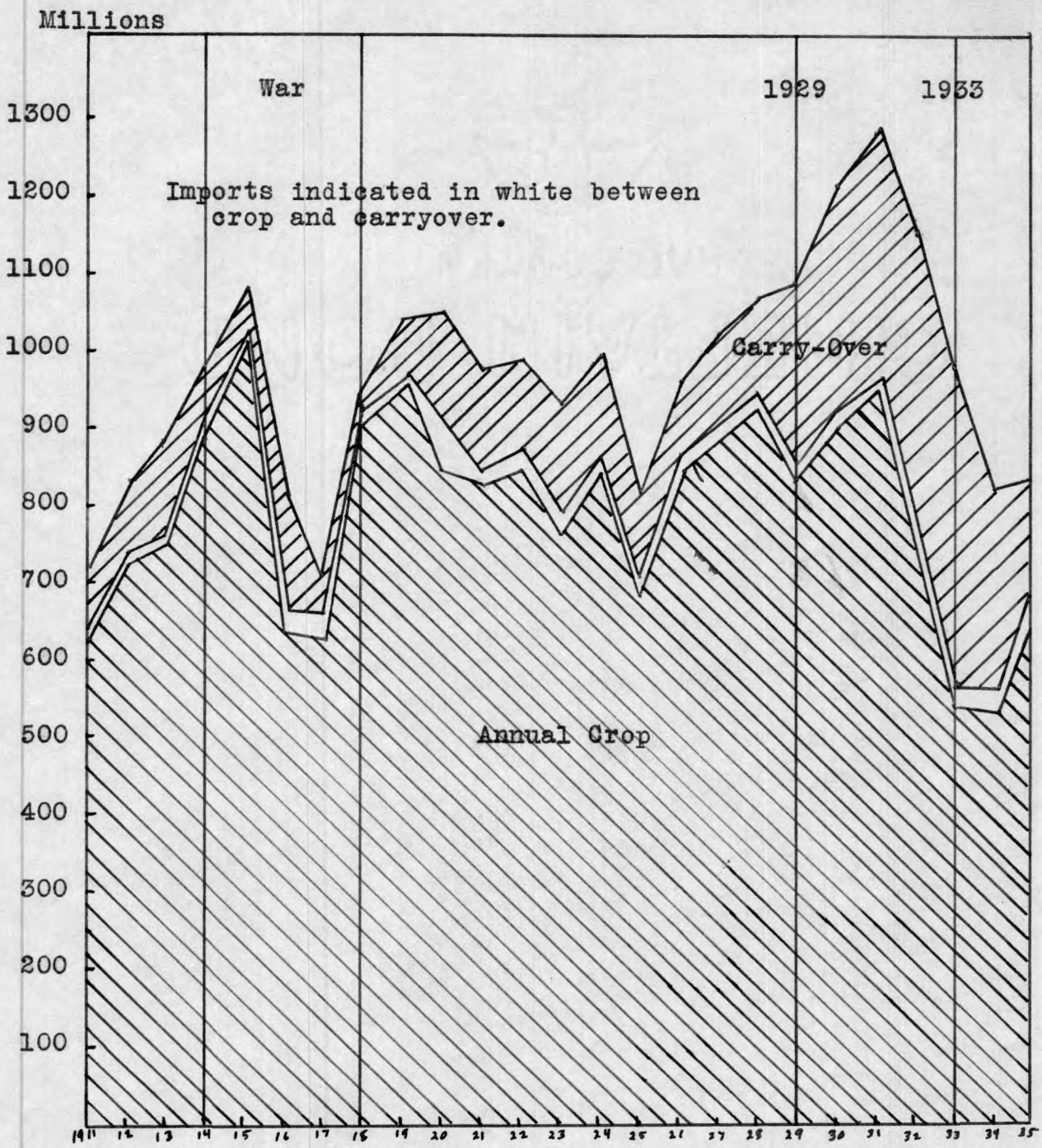

Figure 1. Annual Crop, Imports, and Carry-Over 1911-35

Source:-- Data presented in Table II.

The data of Table II are presented in graphic form in Figure 2. For convenience in interpreting the abnormal elements in the history of the wheat supply during the 1911 to 1935 period, vertical lines mark off the period of the war years, 1914-1918, and the period from the onset of the depression in 1929 to the inauguration of President Roosevelt and the Agricultural Adjustment Administration in 1933.

Contrary to the widespread assumption that there was a vast increase in wheat production during the war years, there was a sharp falling off during 1916 and 1917, with however a sharp rise in 1918, the year of our active participation in the war. Interestingly enough this acceleration of production carried well into the post war period. The widespread incidence of black rust in 1916 and 1917, rather than an intentional cutting of acreage, accounts for the sharp decline of these years, a decline which was the only general decline of production until the 1930's. During these two years total production fell more than 150 million bushels below normal. The uniformly high production of the period might well be food for thought to those who commit themselves to the theory that "Nature" by some mysterious intelligence beyond the comprehension of Man, is capable of regulating production in the best interest of the general welfare.

A succession of good crops from 1926 through 1931 plus a rapidly rising carry-over that accompanied the decline of our foreign markets, the decline beginning as early as 1928, brought an abnormal rise in the total supply to an all-time

peak in 1931 of 1271.7 million bushels. Despite the nearly 200 million bushel decline of the following year the carry-over continued to mount until it reached nearly 400 million bushels in 1933. This was more than three times the normal carry-over and was almost enough wheat to feed the entire nation for a year.

Students of the agricultural problem became frightened at the mounting carry-over and at the decline in the price of wheat. They struggled manfully but to little purpose. President Hoover, who with his party was committed to high prices and "two-car" prosperity, took to the cyclone cellar with the price pegging operations of the late and not greatly lamented Farm Board. Encouraged by supposedly "fixed prices," the farmers cheerily hurled the huge 1930 and 1931 crops into an already water-logged market.(a) There was desultory talk of crop control. The Farm Board advised the farmers to at least "go easy" in their production policies. The "Eat another slice of bread" slogan added a comic but unimportant touch to the picture. In the meantime the Farm Board realized that it had the proverbial bear by the tail and withdrew its support from the market. "Nature took its course" with a vengeance and an enraged agriculture cast aside President Hoover for Franklin D. Roosevelt and his, at that time, ephemeral "New Deal."

Drastic production control was the core of the Agricultural Adjustment Administration program for wheat. Farmers who two years before had sneered at production control and had planted

(a) These crops exceeded normal by 100 and 150 million bushels respectively. (Table II).

more wheat, hastened to sign Agricultural Adjustment Administration contracts. The tragedy of 30 cent wheat jarred agriculture from its traditional policies and made the farmer willing to try something different. Aided by the 1934 drouth the sharply curtailed production permitted the absorption of the surpluses and by the end of the 1935 season our supply and consumption were nearly balanced on a domestic basis. At this time there is not much evidence that we are about to return to the foreign markets.

CHAPTER IV

WHEAT DISPOSAL FROM 1911 TO 1935

A study of the tables of the reports of the Department of Agriculture shows that our wheat disposal falls under the following heads: exports; seed; fed to livestock; domestic human food; and carry-over to the next crop year. Table III is a summary of the disposal factors from 1911 to 1935.

TABLE III. WHEAT DISPOSAL FACTORS IN THE UNITED STATES FROM 1911 TO 1935 IN MILLIONS OF BUSHELS

Year	(1)	(2)	(3)	(4)	(5)	(6)
1911	81.9	79.0	25.0	455.0	78.0	718.9
1912	145.2	78.0	40.0	457.0	91.0	811.2
1913	148.0	82.3	73.0	480.0	76.0	859.3
1914	335.7	93.0	30.0	458.0	55.0	971.7
1915	246.2	85.0	77.0	520.0	163.0	1091.2
1916	206.0	88.0	25.0	560.0	48.0	827.0
1917	132.6	97.0	14.0	455.0	17.0	715.6
1918	287.4	98.0	44.0	460.0	76.7	966.1
1919	222.0	90.9	36.6	536.8	144.9	1031.2
1920	369.3	89.3	20.6	436.2	126.8	1042.2
1921	282.6	88.3	32.7	442.1	114.3	960.0
1922	224.9	85.1	49.4	481.6	137.0	978.0
1923	159.9	73.5	66.9	476.8	144.4	921.5
1924	260.8	81.3	55.9	474.9	114.8	987.7
1925	108.0	79.5	28.2	475.8	104.9	796.4
1926	219.2	85.1	34.4	487.6	122.3	948.6
1927	206.3	91.4	44.5	544.0	123.9	1010.1
1928	163.7	84.6	55.1	505.1	246.7	1055.2
1929	153.2	83.9	59.2	491.5	291.0	1078.8
1930	131.5	81.1	157.5	513.7	326.0	1209.8
1931	135.8	80.1	171.3	495.7	384.6	1267.5
1932	41.2	83.6	122.5	495.5	393.4	1136.2
1933	37.0	71.7	69.6	466.7	286.2	931.2
1934	21.5	75.5	81.4	476.8	152.0	806.2
1935	15.9	82.0	97.5	474.0	150.1	819.5

(1) Exports (2) Use for Seed
(3) Livestock Feed (4) Domestic Human Food
(5) Carry-Over (6) Total Disposal

Source:--Table I. p. 6.

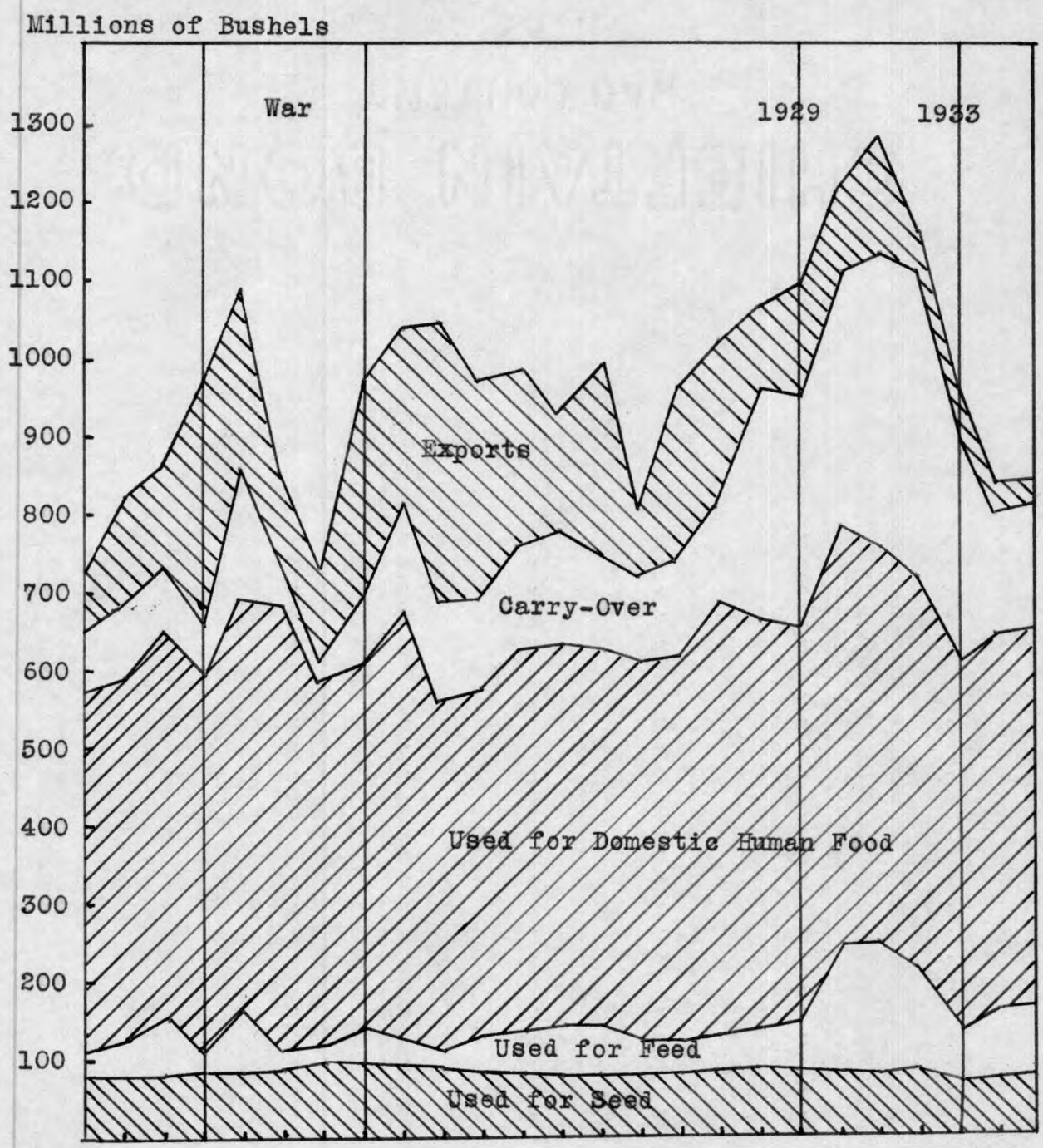

Figure 2. Disposal Factors of Wheat from 1911 to 1935

Source:-- Data presented in Table III.

The data of Table III are presented in the form of a composite summation graph in Figure 2. Since Figure 1 and Figure 2 deal with complementary aspects of essentially the same quantitative totals we find a close similarity in the upper profiles of the two figures. Figure 2 reveals two types of quantities; constants and variables. Except for minor deviations feed, seed, and domestic human food appear as constants. On the other hand exports and carry-over show marked variations of a distinctly complementary character.

The constancy of the factor, wheat used for human food, at around 460 million bushels in the first years of this study and at 475 million bushels in the closing years, despite an increase in the population from 93 million in 1911 to 128 million in 1935 is an aspect of the problem which will be analyzed in Chapter V. The nature and relationship of the variables will be discussed in Chapter VI.

The Andean aspect of the graph during the 1929-1933 period might well cause the average wheat farmer to shy away from the advocates of the "economy of abundance." There was certainly no lack of abundance of wheat during that period but most farmers found very little abundance in their living. The inverse relationship between exports and carry-over introduces the problem of the relative merits of self sufficiency and export as the means of stabilizing the wheat situation.

Figure 2 reveals the same general return to normal totals in 1934 and 1935 that was shown in Figure 1. It will be shown in later discussion that prices also approached normal.

CHAPTER V

CONSTANT FACTORS IN THE SUPPLY-DISPOSAL PROBLEM

Wheat Used for Seed

The amount of wheat used for seed has varied between 72.3 million bushels and 98 million bushels. This use for seed represents approximately ten per cent of the normal production and the variation is only three percent of the total normal crop. Using the mean figure of 83 million bushels there is a deviation of slightly over ten million bushels, or a deviation equal to slightly more than one per cent of the total crop. This deviation is such a slight proportion of the total crop that it becomes possible to take the use of wheat for seed as a constant. A closer examination of Table III, column 2, does however bring to light some interesting variations. There was a sharp increase in plantings in the war years in response to the war prices. In 1923 there was a drop to 73.5 million bushels used for seed. This is probably accounted for by the discouragement of the farmers at the collapse of the war prices during the preceding two years. The higher prices of the following years (Table I, column 2) revived the expansion movement, and plantings reached their post-war high in 1927. The following year the plantings returned to normal and there was no important change until the crop curtailment policies of the Agricultural Adjustment Administration brought about reduced plantings. With the disappearance of the surpluses by 1935 there was a return to a normal volume of seed usage with 82 million bushels used

that year. These figures are not important in themselves as variable factors in the total problem, but they are interesting as an illustration of the reaction of the wheat industry to market conditions.

Since most farmers grow their own seed this form of disposal brings no income and may not be counted in the income figures of the farmers. Only in the relatively rare instances of drouth is it necessary to buy seed. The farmer becomes a market for the product of another farmer-- a case of taking it out of one pocket and putting it in another so far as the total well being of the wheat growing industry is concerned.

In a few instances, notably in the spring of 1936 following the destruction of a considerable part of the wheat crop by black rust, it has become necessary to import certain seed wheats from Canada. This importation of seed, plus the need for hard spring wheat for milling purposes, largely accounts for the sharp rise of imports that year---our domestic supply being entirely adequate for our needs on a quantity basis. This statement is supported by the fact that there was a 100 million bushel carry-over at the end of the 1936 marketing season, an amount which exceeded the net imports three times.[1]

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1. Department of Agriculture, Market Reporter, July, 1937.

Wheat Used for Live Stock

The casual reader will be surprised to find that the use of wheat for live stock feed is a factor in the total disposal. Normally it is not a large factor, being less than fifty million bushels for twelve of the years of the period of this study. This is about six per cent of the total normal crop. In actual practice this is wheat used for poultry feed, screenings mixed with other feeds--an amount that would be wasted otherwise, -- and by-product feeds such as bran.

Table III, column 3, reveals an interesting expansion of the feed usage in the depression years. This is not surprising when it is remembered that wheat at 30 cents per bushel is one of the cheapest and best livestock feeds. It compares by weight with oats at 15 cents per bushel, corn at 25 cents per bushel, and hay at ten dollars per ton.[1] The unexpected rise in the use of wheat for feed in 1935 probably is due to the fact that in that year there was extensive damage to the spring wheat crop by black rust, rendering much of the crop unfit for any other use.

Since the variation in the use of wheat for feed is a resultant factor of other conditions, rather than a causal factor of the other variations in the supply-disposal problem it will be disregarded in the study of the significant factors.

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1. These are prices substantially lower than the current prices during the same time.
Yearbook of Agriculture, 1935, p. 379 and p. 391.

Use of Wheat for Domestic Human Food

An examination of the data relating to the use of wheat for food reveals two outstanding facts: first, that there has been no marked increase in the total consumption of wheat for this purpose in the period from 1911 to 1935; second, that the per capita consumption has dropped from five to less than four bushels per capita in the same period.

With the period of this study extending through the so-called normal pre-war years; the war years; the post war depression; the boom years of the middle 20's; the Great Depression; and the first years of the New Deal, the most important fact about the per capita consumption is its continuous downward trend. Our consumption changes have been independent of price and the economic well being of the country as a whole. We must look to other causes than the presence or absence of "prosperity" for the basis of wheat consumption for human food. Evidently there have been other influences than income at work on the public's eating habits. Two popular theories seem to be contradicted by the facts revealed in Table I, column 8. The first, that bread is the poor man's food, would lead us to expect an increased consumption in time of depression. The consumption figures for the depressions of 1914, 1921, and 1929 fail to support this conclusion. A contradictory theory that people would eat more wheat if they had better incomes is likewise exploded by the figures for boom periods; the War, the booming 20's; and the post-depression figures. What then does cause people

to vary their consumption of wheat? Evidently it is the result of dietary changes independent of the general economic well-being. Fashions in diet, plus a general change in the nature of work, may be offered as a reasonable explanation. The trend to a more diversified diet which has characterized the recent years necessarily means that as new foods are introduced into the diet the demand for the traditional foods will decrease. In the nature of things people tend to eat only as much as they need, which means that diet changes are replacement changes, rather than additions to the food supply. The popularizing of the so-called "reducing diets" among women has tended to reduce the total consumption of food.

A significant cause of the reduction in the use of wheat for food has been the change from the dominance of strenuous physical work among the laboring classes to the general adoption of machine work. The machine work is perhaps as fatiguing as the manual work it displaces, but its more sedentary and less strenuous nature reduces the need for energy food. Wheat being a relatively inexpensive energy food, it bears the brunt of the dietary changes.

Considering the fact that increase in the per capita consumption of wheat to the pre-war level would increase the annual consumption by about 125 million bushels, it can be seen what our dietary changes mean to the wheat farmer. Such an increase in the consumption would absorb the excess production of recent years and perhaps would eliminate the "farm problem" so far as the wheat industry is concerned.

In view of the history of our wheat consumption the farmer must look elsewhere than to increased domestic use for food for the solution of his problem. The problem is after all the simple application of the principle of supply and demand. Perhaps if some "scientist" could discover a new vitamin or mineral value in wheat, sufficient propaganda could be built up to induce an important increase in the use of wheat. To the advice to "eat another slice of bread" the public has responded with its characteristic shrug and,"Why?"

In the meantime, for the purpose of this study, the use of wheat for human food is taken as a constant and is not pursued as a causal factor in the shifts in the price of wheat.

Here is also sterile ground in which to seek for a long-time solution of the wheat grower's problem. In an exchange economy it is futile for the producer to produce more than the public may reasonably be expected to consume.

CHAPTER VI

VARIABLE FACTORS IN THE SUPPLY-DISPOSAL PROBLEM

Wheat Production

The normal annual wheat production as shown in Chapter II is 788.9 million bushels. Total annual production has varied between 496.9 million bushels in 1934 and 1008.6 million bushels in 1915.(a) In most years it has ranged between 700 million and 900 million bushels. These variations have been in response to varied plantings and varying yields per acre from year to year. It is significant to note that in every year of the 25 year period the production plus a normal carry-over has produced a supply of wheat sufficient for our domestic needs. Our domestic needs being a combination of seed, feed, and food; the sum of the need for seed at 75 million bushels, for feed at 75 million bushels, and for food at 475 million bushels gives a total necessary supply of 625 million bushels. From these figures it appears that there is no real concern that the supply is likely to fall below our domestic needs. Subtracting the wheat needs from the normal supply the normal exportable or carry-over surplus becomes 165 million bushels.(b) With the carry-over a normally continuous quantity, the coincidence of this figure with the normal export figure of 158.4 million bushels indicates the outlet of this excess production.(b)

(a) Table I, column 1. p. 6.

(b) p. 28.

The importance of the export market to the wheat farmer is shown by the above figures. Until the depression the United States wheat industry was on an export basis. The relationship between this fact and the price and tariff conditions is discussed in Part II.

The full importance of the export market under unregulated production becomes more apparent when one notes that it represents 20 per cent of the total normal production. The skyrocketing of the carry-over during the depression years is accounted for by the piling up of these large exportable fractions on top of each other in the years during which the export market had practically disappeared, a fact clearly shown in Figure 2.

In conclusion we may point out that there is a significant variation of wheat production which will be examined more fully in Chapter VII.

Wheat Price Norm with Variations

The same method outlined in Chapter II for determining the norm for production was used in determining the price norm. For seventeen of the years of this study the price ranged between $0.80 per bushel and $1.50 per bushel. The norm is determined by averaging all these prices. The normal price thus determined is $1.03 per bushel.

Table I, column 2, shows that the price during the entire period has varied between $0.38 per bushel and $2.16 per bushel. This variation of nearly six-to-one has been the heart of much of the discussion of the wheat problem. In the wheat economy

of the United States it has had tragic aspects. The wheat industry is essentially a debtor industry. If a farmer finds himself in debt on a $2.16 basis and then must pay the debt on a $0.38 basis we find the key to the bitter controversy that has swept the Middle West since the post-war years. Reduced to production figures it means that in 1919 a farmer could pay a one thousand dollar debt with the product of 46 acres of wheat at ten bushels per acre. In 1932 it would have taken the product of 263 acres to pay the same debt. This is the extreme of the problem, but there is a wide range for disaster in the price changes between these two extremes.

It is not surprising that the farmers embraced the unaccustomed policies of the Agricultural Adjustment Administration when this organization appeared on the scene at the bottom of the depression. Farmers generally were completely disconcerted. They were ready to "try anything" that gave any promise of relief from the tragedy of deflation. The subsequent revival of the price level has placed the burden of proof on those who would challenge the wisdom of the Agricultural Adjustment Administration policies.

Total Farm Value

In establishing the norm for the total farm value of the wheat crop, the average of the seventeen values lying between 500 million dollars and 1100 million dollars is taken. The average of these values gives the norm of 808 million dollars for the annual wheat crop. The deviation of this fig-

ure from the 815 million dollars which is the product of the normal crop and the normal price is accounted for by the weighting effect of certain years when the production was large and the price relatively small.

In farm value, as in price, there is a wide range of value. The farm value of the crop has varied from a low of 283.8 million dollars in 1932 to a high of 2059.4 million dollars in 1919, a ratio of more than seven-to-one.(a) The social implications of this variation are too great to be discussed extensively at this time. Some aspects of the problem have already been indicated.

Attention is called to the fact that these figures are "Farm Value" amounts and not "Farm Income." Farm Value is the value of the total crop. Farm Income is the amount received from the sale of the part of the crop placed on the market.

Since this item is a resultant of production and price factors we shall go somewhat further into the matter at this point. In the so-called normal years from 1911 to 1913 the annual farm value fell between 500 million and 600 million dollars. The war years brought a sharp rise, culminating in the all time high of over two billion dollars in 1919. The War was followed by a sharp drop, with the pre-depression values ranging around 900 million dollars. With the coming of the depression, values dropped away rapidly to the

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(a). Table I, Column 3. p.

1932 figure which is approximately one-third of normal. With the coming of the New Deal there was a slow restoration of values until by 1935 the value reached the pre-war level, although falling far short of the normal figure for the entire period.

Table I does not give a complete picture of the restoration of the economic position of the wheat industry because it omits the income from the adjustment payments under the Agricultural Adjustment Administration program. These payments were 98.6 million dollars in 1933; 101.6 million dollars in 1934; and 115.6 million dollars in 1935.[1] Adding these figures to the crop values of Table I the 1933 crop value becomes 490.4 million dollars; the 1934 value becomes 522.4 million dollars; and the 1935 value becomes 638 million dollars. This leaves 1935 short of the pre-depression level, but represents a gain of more than 100 per cent over the depression level.

Net Exports

For the purpose of comparison with other variables, norms based on net exports, rather than independent norms for exports and imports, are used. In establishing this norm the fifteen central totals, ranging from 92.7 million bushels to 239.6 million bushels, are averaged giving a norm of 158.4 million bushels.

The importance of this factor to the wheat grower has already been pointed out in Chapter VI. At the normal price

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1. Department of Agriculture, Yearbook of Agriculture, 1936, p. 1155.

of wheat, exports bring an important addition to the total income of the United States wheat growers. This addition has not been entirely replaced by the 100 million annual payments of the Agricultural Adjustment Administration. Until the almost complete disappearance of the foreign market in 1932, following its sharp decline beginning in 1928, the foreign market, as shown in Figure 2, consistently absorbed our surplus production. Oddly enough, Table III shows that 1920, the year of our largest export trade, was also the year of our largest import volume. In comparing columns 1 and 4 of Table I there is shown a definite tendency to export all wheat in excess of approximately 600 million bushels. This fact checks closely with the estimated domestic need of 625 million bushels shown in this chapter. For the years 1934 and 1935 there was a small excess of imports over exports and a balancing of the production plus carry-over and the consumption factors. As will be shown in Part II this shift of balance has resulted in domestic price differentials of considerable advantage to the American grower.

The combined influence of the Agricultural Adjustment Administration and the recurring drouths of the 30's has placed our production and consumption on a domestic basis. Whether this is desirable as a permanent policy will be discussed more fully in the final chapter.

Our ability to maintain our export volume at nearly wartime levels up to 1927 may be interpreted as the result of two factors: one, the generous credit policies of the Amer-

ican lenders; and second, the disappearance of Russia from the world markets during the confusion of the early years of the Soviet government.[1] The return of Russia to this market in the year 1927 was one of the reasons for the loss of the market to the United States.[2] Russia exported 50 million bushels in 1927 and increased her exports to 111 million in 1931. The coup de grace was administered to our dwindling foreign trade when the Smoot-Hawley tariff bill of 1930 effectively closed the foreign markets to the American farmer. The elementary fact that we forgot was that trade is trade, not just selling.

Correlations will be discussed in the next chapter.

Carry-Over

Carry-over is the term used for the amount of wheat on hand at the beginning of each crop year. Stocks on hand as of July 1 in each year are taken as the carry-over.[3] This carry-over consists of wheat on hand on farms; wheat on hand in country mills and elevators; commercial stocks; wheat in merchant mills and elevators stored for others; and wheat in transit and bought to arrive. To establish the normal carry-over the average of the carry-over in the thirteen years in which the total carry-over ranged between 91 million bushels and 163 million bushels is calculated. The norm thus calculated is 130 million bushels.

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1. Yearbook of Agriculture, 1928, p. 368.
2. Yearbook of Agriculture, 1935, p. 685.
3. Yearbook of Agriculture, 1935, p. 363.

This normal carry-over equals one-fifth of our normal domestic needs. Table I, column 9, shows several striking variations from the normal. Carry-overs since the War have been generally higher than before or during the War. The 1917 figure reveals an emptying of our bins in the rush to meet the wartime demands of the European countries. After the War the industry coasted along rather evenly until dwindling exports from 1928 onward brought a rapidly mounting carry-over. The regularity of the carry-over figure, with the exceptions noted, indicates that the normal carry-over has been adequate to meet our needs. We have not, except in 1917, come to the new crop with our cupboards bare, but at least they were empty enough to make room for the new supply.

As will be pointed out more fully in a later chapter, there is a significant correlation between the abnormal carry-over of the years from 1928 through 1933 and the disastrous collapse of prices during the same years. It is also significant that as the excessive carry-over of these years--the much discussed surplus--disappeared there was a gradual restoration of the price level. The low production of these years permitted the surplus to be absorbed by the domestic consumer. To date there has been no important revival of foreign trade--the outlet for our excess production in the pre-depression years.

As long as our production was consistently above our needs a relatively small carry-over was entirely adequate. The 150 million bushel carry-over of 1934 and 1935 is somewhat in excess of normal. With the wheat industry adjusted to a

domestic basis it probably will be wise to maintain a somewhat larger reserve in the good years to take care of the contingency of a generally abnormally low production. We had poor years before the depression in which production fell off sharply. With the wheat industry on an export basis these poor crops simply meant that there was less wheat to export.

In the next chapter there will be a discussion of the relationships of the variable factors outlined in this chapter.

CHAPTER VII

COMPARISON OF THE VARIABLE FACTORS OF THE SUPPLY AND DISPOSAL OF WHEAT FROM 1911 TO 1935

Price, Production, and Farm Value

The variable factors of the wheat supply and disposal problem in the United States from 1911 to 1935 are presented in Table IV as annual percentages of the normal.

TABLE IV. PERCENT OF NORMAL OF THE ANNUAL FIGURES FOR THE VARIABLES IN WHEAT SUPPLY AND DISPOSAL FROM 1911 TO 1935

Year	Price	Production	Farm Value	Net Export	Carry Over
1911	84	78	66	50	60
1912	78	93	73	91	70
1913	77	95	74	92	58
1914	94	114	109	212	42
1915	93	128	120	151	125
1916	139	80	113	114	37
1917	198	79	157	65	13
1918	198	115	229	175	59
1919	209	121	255	137	111
1920	177	107	190	197	98
1921	100	104	104	168	88
1922	93	107	101	129	106
1923	90	96	87	83	111
1924	121	106	129	161	88
1925	139	85	119	59	81
1926	118	106	126	130	94
1927	115	111	129	120	95
1928	97	116	113	90	189
1929	100	104	105	89	224
1930	65	113	74	71	251
1931	38	118	45	78	296
1932	37	95	35	20	303
1933	72	67	48	16	217
1934	82	63	52	-2	117
1935	81	79	65	-19	116

Source:-- Calculated from the data of Table I and the norms of Chapter VI by the formula described in Chapter II.

The percentage variation of production, price, and farm value is shown in Figure 3. In order to better interpret the effect of abnormal periods such as the War and the Depression these periods are indicated on the graph with vertical lines. The normal figures for the three above factors are 788.9 million bushels, $1.03, and 808 million dollars respectively.

The first fact that attracts our attention is the sharp rise of prices and value during the war years, the impetus of this movement carrying forward through 1919 and 1920. Contrary to popular opinion there was but a moderate rise in production during the war period. The reason for this failure of production to increase greatly despite the high prices is discussed in Chapter III. The sharp recession to "normalcy" was accomplished by 1922 when the lines for all the factors are close to the normal, or 100 per cent line. In the boom years of "Coolidge Prosperity" there was a substantial revival the price and value figures well above normal. A slow recession set in in 1927 and assumed tobaggan proportions after 1929. Following the trough of the depression in 1932, there was a consistent rise to 1935. If this rise continues through the following season it should bring nearly normal figures during the current year (1937).

Turning attention to the price and production lines a notably different situation appears. There is a marked trend for the two lines to move in opposite directions: a tendency which appears very definitely in 1912, 1913, 1915,

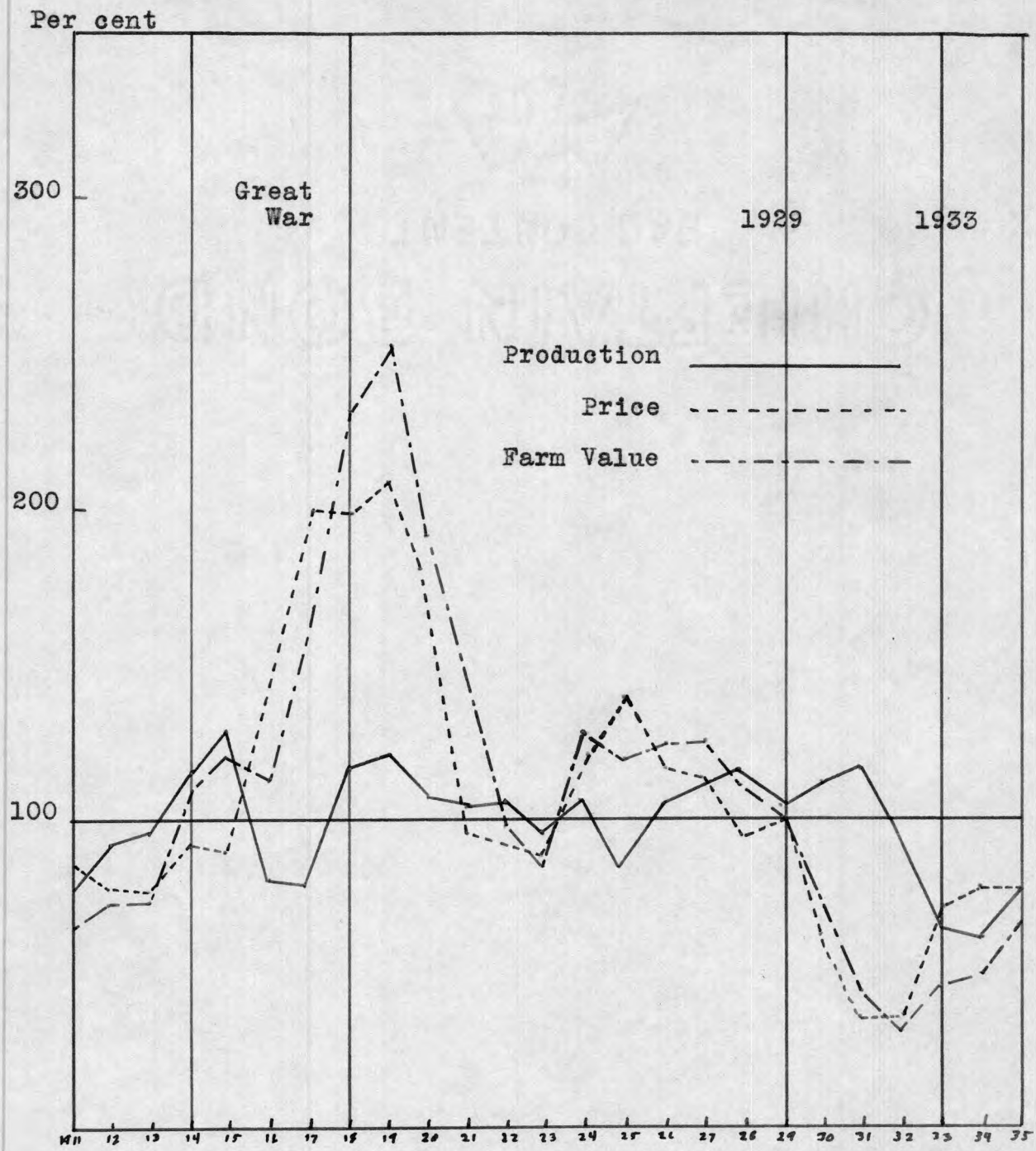

Figure 3. Variation of Wheat Prices, Production, and Farm Value in Per Cent of Normal from 1911 to 1935 (a)

Source:-- Data presented in Table IV.

(a) Normal for price, $1.03. Normal for production, 788.9 million bushels. Normal for farm value, 808 million bushels.

1916, 1918, 1922, 1925, 1926, 1927, 1928, 1929, 1930, 1931, 1933, 1934, and 1935. This is in accord with the law of supply and demand and bears out the farmer's complaint that prices are always low when he has a good crop.

The cause and effect relationship tends to work both ways. High prices tend to bring heavier plantings the following year thus bringing at least potentially higher production. If this increased acreage results in an increased production the increased supply is effective in driving down the price. According to the "let nature take its course" school of economics these opposite forces constitute "natural" controls and are all the control necessary to insure a reasonably stable market. In the face of the erratic movements of the price line during this 25 year period we can hardly say that the wheat price situation has been stable. A six-to-one range of prices is a condition not at all conducive to an orderly and prosperous agricultural industry.

Production on the other hand presents a relatively stable picture. In only one year, 1915, did the production exceed 120 per cent of normal; and in only two years, 1933 and 1934, did the production fall below 80 per cent of normal. The low point however was the result of production control policies coincident with severe nation-wide drouths.

This picture contrasts sharply with the popular one of alternating years of glutting abundance and famine.

Production, Exports, and Carry-Over

Three factors in the supply-disposal problem of the wheat industry that are closely related to each other quantitatively are production, export, and carry-over; it being the function of the latter two to absorb the excess production in any year. In the case of the carry-over this function is one of setting aside rather than absorption.

The fact that stands out most definitely in Figure 4, a graph in which these three factors are brought together for comparison on a per cent basis, is that the production and export figures tend to move in the same direction. This indicates that under the conditions preceding the depression, the world offered a ready market for all the wheat we did not need for ourselves. Carry-over on the other hand remained relatively constant up to the time of the depression. The stepping up of the carry-over after the War, and the low point of the carry-over in 1917, mentioned previously, show clearly on this graph also.

The roots of disaster were well established before 1929 so far as the wheat grower was concerned. As shown in Figure 4, in 1927 the export and carry-over lines cross for the last time and separate rapidly. With large crops and a falling export market there was no place for the wheat to go except into storage. The rapidly mounting stock of reserve wheat resulted. The commercial buyer , facing no apparent market for his present stock and new crops coming into the market, cannot be blamed for withdrawing his support from

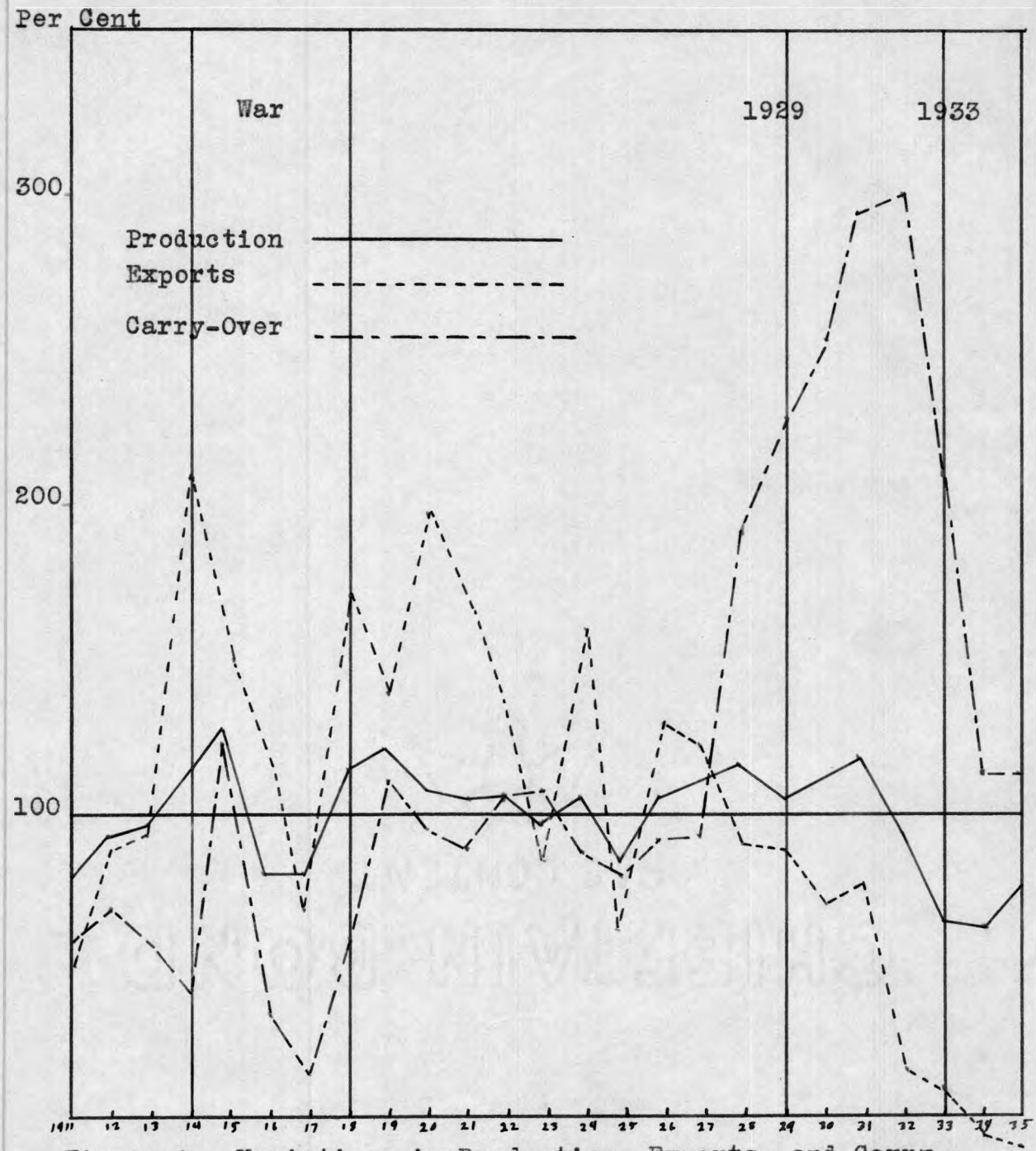

Figure 4. Variations in Production, Exports, and Carry-Over in Per Cent of Normal from 1911 to 1935 (a)

Source:-- Data presented in Table IV.

(a) Normal for production, 788.9 million bushels. Normal for exports, 158.4 million bushels. Normal for carry-over, 130 million bushels.

the market. With the sharp cutting of production from 1933 onward, the domestic market gradually absorbed the excess carry-over and the carry-over became relatively normal by the end of 1934.

In 1934 our net export figure crossed the zero line and we find ourselves on an import basis for the first time. This import figure may seem surprising with a 150 million bushel carry-over on hand. The explanation for this lies in certain needs of the market. The sharply increased price differential between Canada and the United States made the United States market attractive to the Canadian producer. In addition to this cause, the loss of the hard wheat crop by drouth in 1934 and by black rust in 1935 forced the American millers to look elsewhere for their supply of hard wheat needed to make the grade of flour the American market demands.

If the study of this graph teaches anything, it shows that in the absence of the foreign market we cannot go on producing wheat at the pre-depression production level and expect our growers to survive. We must do one of two things: either restore the export market or cut down our production by an annual average of 160 million bushels. This means a 20 per cent cut in production. The Agricultural Adjustment Administration has attempted to do the latter. The first solution has the strongest support of conservative opinion but we can not go out and willy nilly find buyers for our product at the price we want.

Price, Exports, and Carry-Over

A third comparison of the variable factors of the problem is presented in Figure 5. Figure 5 presents a comparison graph of price, exports, and carry-over.

The price and export lines present a direct variation. With the exception of certain abnormal years the tendency is for good prices and a heavy export business to coincide. Here again is an illustration of the law of supply and demand at work in a free market. At the same time it indicates a heavy dependence of the American wheat grower upon the foreign market for his prosperity. The only important deviation from this correlation is after 1932. Thereafter the reduced production brought a relative domestic scarcity, permitting the domestic market to absorb the supply without the help of the foreign market. There was a slight exception to the general trend in 1925 when a poor crop was accompanied by low export volume at the same time that the price surged upward sharply.

The export and carry-over lines show an inverse variation for the most part. This is a result consistent with the fact that these two factors are essentially complementary in caring for the excess of production over current domestic needs. Other things being equal it is to be expected that when one of these factors increases the other decreases, and the graph shows that there is a marked tendency for this to happen in the actual operation of the markets despite the vagaries of price and production.

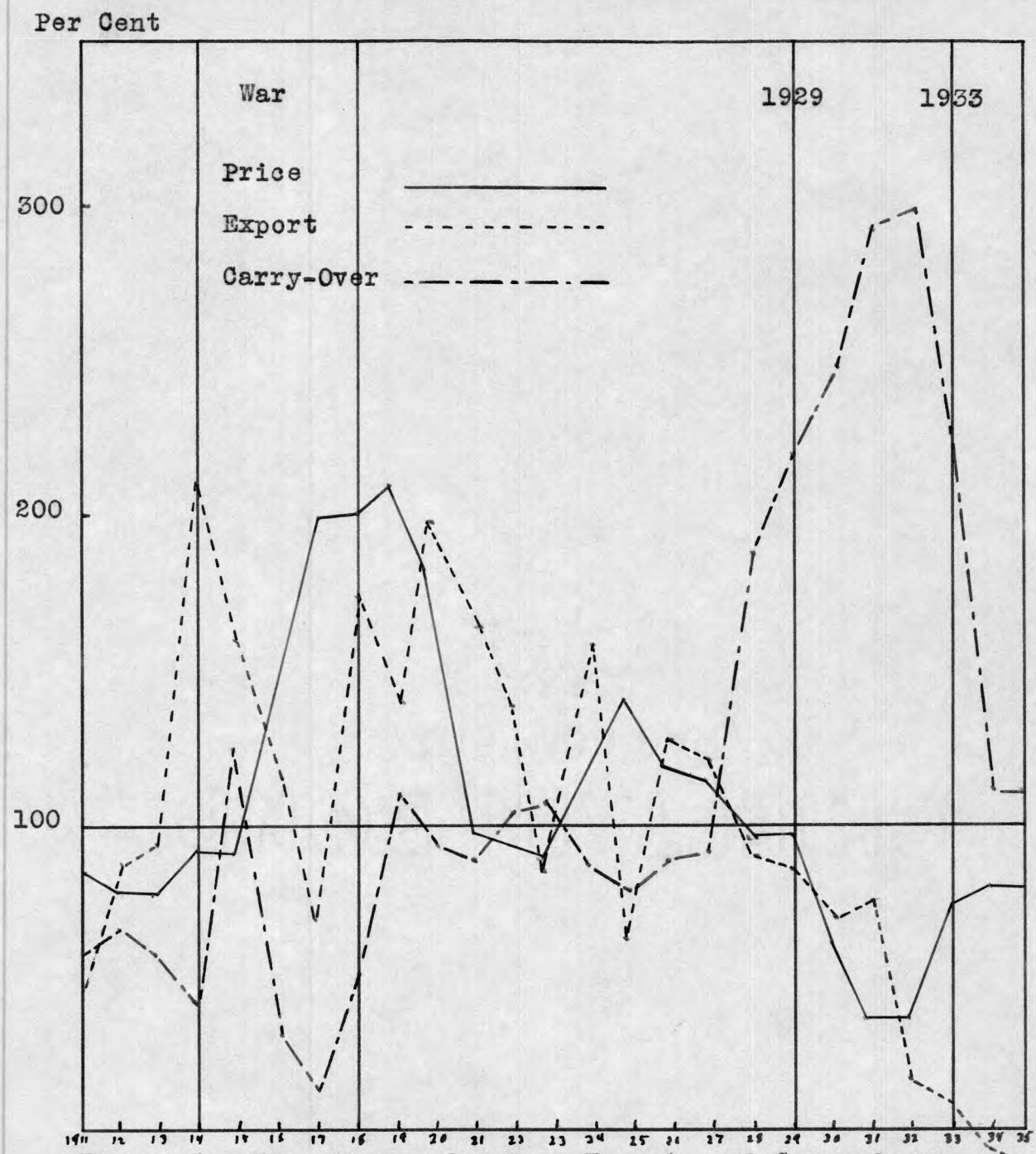

Figure 5. Variations of Price, Export, and Carry-Over in Per Cent of Norms from 1911 to 1935 (a)

Source:-- Data presented in Table IV.

(a) Norm for price, $1.03. Norm for Export, 158.4 million bushels. Norm for carry-over, 130 million bushels.

The war years tended toward high prices and heavy exports, but as already pointed out, the poor crops of 1916 and 1917 prevented a full realization of the possibilities of the war trade. In the anxiety for war profits we nearly swept the bin clean in 1917. Moving from the war years to the second period of irregularity, the depression, price and export figures show an opposite trend. The decline of the export market which got under way in 1927 was piling up a rapidly mounting surplus. This growing surplus is vividly shown by the towering proportions of the carry-over line during the depression years. With the absorption of this surplus, prices moved toward normal in the ensuing years.

In the meantime the dwindling foreign market had vanished and our net exports dropped below zero in 1934 and 1935. The volume of imports is hardly the flood pictured by the many would-be "farmers' friends" who write so heart breakingly from the well upholstered comfort of air conditioned offices, but, as will be shown in Part II, the shift to an import basis has brought a price differential of considerable advantage to the wheat grower.

PART II

PRICES: SEASONAL AND INTERNATIONAL TRENDS

CHAPTER VIII

SEASONAL PRICE MOVEMENTS

Having produced his crop the farmer finds himself faced with the problem of his marketing policy. The cheapest marketing method is to take the grain directly from the field to the nearest buying point and sell it at once. The farmer also has the privilege of taking his grain to a public ware house and storing it until such time as he decides to sell. In the latter case he must pay storage on the stored grain, an amount that is commonly deducted from the proceeds of the grain when sold. This is a convenient plan but tends to be rather expensive. A third method is to store the grain in granaries on the farm until the producer is ready to place it on the market. All of these policies have been practiced and their wisdom widely discussed, with the usual lack of factual basis.

Some hold that in the long run it pays to market the grain at harvest time and save storage, labor, and interest costs. Others with equal sincerity hold that the way to "make money" is to hold the grain for the higher prices in winter and spring. For the debtor farmer the problem is simplified. He must sell in the fall to get money to meet obligations commonly maturing at this time of the year. This circumstance has given rise to the often stated conclusion that there is a conspiracy between the creditors and the

marketing agencies to get the grain away from the farmer at a low price and keep the farmer in debt as long as possible. It is a little difficult to follow this line of reasoning. It would be an exceedingly short-sighted creditor who would not want the old obligations paid up as quickly as possible so that he could sell the farmer some more products.

The current practice is to market the bulk of the crop during the months of July, August, September, and October. Table V shows that from 1914 to 1933, an average of 62 per cent of the crop was marketed during these four months.

TABLE V. MARKETING BY FARMERS IN JULY, AUGUST, SEPTEMBER AND OCTOBER FROM 1914 TO 1933

Year	Per Cent Marketed	Year	Per Cent Marketed
1914	49	1924	65
1915	47	1925	63
1916	62	1926	62
1917	57	1927	66
1918	70	1928	67
1919	67	1929	70
1920	53	1930	66
1921	64	1931	63
1922	58	1932	60
1923	61	1933	63
		Average	62 (a)

Source:--
Yearbook of Agriculture, 1920, p. 558
Yearbook of Agriculture, 1922, p. 597
Yearbook of Agriculture, 1935, p. 359
(a) Calculated arithmetic average of yearbook statistics.

An ironical commentary of the ability of "everybody" to judge the market is shown by the fact that in 1920, with wheat at $2.43 in July, there was the lowest seasonal marketing of the entire period. By December of the same year the

price was down to $1.46, and by the following May [a] the price had fallen to $1.19, less than one-half the price at the beginning of the normal marketing season. Apparently this costly experience had not been forgotten in 1932, for in that year with the price at 38 cents the seasonal marketings were normal.

Having shown the customary marketing practice of the wheat industry, the problem arises as to whether or not some other policy would be more profitable in the long run. To discover the facts regarding the seasonal price changes the weighted average price for each month of the period from 1911 to 1935 is arranged in Table VI. The prices are then averaged for each month: (1) for the entire period; (2) for the first ten years of the period; (3) for the last ten years of the period; and (4) for the nine years from 1921 to 1929 inclusive. These averages are arranged in Table VII.

The purpose of taking these various averages is to determine the month by month average price for the entire period and for the selected periods in order to find what, if any, changes are occuring in the seasonal marketing trends. The fourth set of averages shows price trends in the period between the "war prices" and the "depression prices."

In analyzing the 25 year average we find the maximum average range of price is ten cents per bushel; ranging between $1.11 in September and November and $1.21 in May. With the approach of the marketing season the price falls off sharply

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(a) Table VII shows May as the highest average price.

TABLE VI. WEIGHTED AVERAGE PRICE PER BUSHEL RECEIVED BY FARMERS IN THE UNITED STATES FROM 1911 TO 1935

Year	Jan	Feb	Mch	Apr	May	Jun	Jly	Aug	Sep	Oct	Nov	Dec
1911	89	87	85	84	85	85	84	84	87	90	89	88
1912	89	91	92	96	101	101	94	88	85	84	80	76
1913	78	80	80	80	82	82	79	77	78	77	78	80
1914	81	82	84	84	84	80	77	85	93	95	98	103
1915	119	132	133	136	136	117	105	101	93	92	93	97
1916	108	108	101	101	101	97	100	119	134	147	159	155
1917	158	165	172	213	247	234	224	219	205	200	200	201
1918	202	202	202	203	203	203	204	205	206	206	205	205
1919	206	208	211	223	230	225	220	211	208	211	214	223
1920	234	231	230	243	251	256	243	225	217	201	166	146
1921	149	148	140	122	119	120	109	103	103	100	93	93
1922	95	107	117	119	119	110	100	93	89	94	99	103
1923	105	104	106	108	108	101	90	86	91	94	94	97
1924	98	98	99	96	97	99	106	117	114	130	134	141
1925	162	170	164	141	149	153	140	150	144	136	149	154
1926	158	155	146	142	142	139	128	125	118	121	124	123
1927	122	123	121	111	123	130	127	123	119	114	111	114
1928	115	116	122	129	144	132	118	95	94	99	97	98
1929	99	104	105	100	90	87	102	111	112	112	103	108
1930	108	101	92	93	88	88	71	74	70	66	60	61
1931	59	59	58	59	60	52	36	35	36	36	51	44
1932	44	44	44	43	42	37	36	39	37	35	33	32
1933	33	32	35	45	59	59	87	75	71	64	71	67
1934	69	72	71	69	70	79	79	90	92	89	88	91
1935	89	88	86	90	88	77	76	82	86	96	89	90

Source:--Yearbook of Agriculture, 1926, p. 818
Yearbook of Agriculture, 1935, p. 564
Department of Agriculture, Statistical Abstract, 1936

to $1.13 in July, the first month of the marketing season, and varies in a narrow range until January. The Table shows that the price remains reasonably constant during the marketing season, with a general rise during the six months preceding the next marketing season. The average price during the marketing season is $1.12. Allowing for the necessary expense of handling, investment, storage, and insurance this season differential of

TABLE VII. MONTHLY PRICES FOR SELECTED PERIODS FROM 1911 TO 1935 IN CENTS PER BUSHEL

Period	Jan	Feb	Mch	Apr	May	Jun	Jly	Aug	Sep	Oct	Nov	Dec
1911-35	115	116	116	117	121	118	113	112	111	112	111	112
1911-20	136	139	139	146	152	148	143	141	141	140	138	137
1926-35	90	89	88	89	91	88	87	85	84	83	83	83
1921-29	123	125	124	119	121	119	113	111	109	111	112	115

Source:--Monthly averages calculated from the data of Table VI.

ten cents is hardly excessive. A change in the marketing practices would undoubtedly reselt in a narrowing of the differential, thus absorbing any advantage that might otherwise be gained by such a change. Individual farmers, with adequate storage facilities, could add substantially to their annual income by marketing in the high month, May. But, even in their case the gain would be offset partly by the cost and inconvenience of handling. At the current public warehouse storage rates there would be no advantage in such a change in marketing practice. These conclusions are based on average conditions. Any other marketing plan would be a pure gamble and in the long run the gains of the good guesses would be wiped out by the bad guesses. The plan based on these figures would not always work out. A farmer following this plan in 1920 would have incurred an average loss of $1.44 per bushel, the difference between the July price of 1920 and the May price of 1921. Such a loss would have wiped out the gains of a lifetime of careful marketing practice. The general tendency to "hold" in 1920 as shown by the low marketings of the marketing season of that

year brought heavy losses to many growers.

The range in time and amount of change during the first ten years of the period from 1911 to 1935 was similar to the changes for the whole period, except that in the former period the low point of the period came in January. This shift of the low point is probably accounted for by the incidence of wartime price changes in months having no normal relationship to the normal price trends.

In the last ten years, from 1926 to 1935, the May price is still the high point of the year with the low point falling in the last three months. During this period the price differential between May and the marketing season is only six cents. It would appear from these comparisons that the differential tends to have a proportional relationship to the total prices, rather than being an absolute amount. With the narrow margin of the last ten years there has been little justification for the average farmer making any drastic change in his marketing method of selling at the time of harvest.

The period between 1920 and 1929, representing the period between the end of the "war prices" and the onset of "depression" prices was a period of generally fairly high prices and relatively high production. During this period the price ranged between $1.09 in September and $1.25 in February. This gives a range of 16 cents. The abnormally large range seems to be an expression of the generally speculative spirit of the times. During this period a farmer could have made substantial gains by holding his wheat from August to February. No doubt the reason for no general trend to this marketing practice was the memory of the fiasco of 1920.

CHAPTER IX

COMPARISON OF AVERAGE PRICES AT CHICAGO, WINNIPEG AND LIVERPOOL FROM 1911 TO 1935

No study of the domestic market situation could be complete without a comparison with some of the principal foreign markets. Such a comparison is necessary to determine the relationship of the domestic price to prices in other markets. From such a comparison it is possible to determine the effect of such policies as tariff and production control on the price situation. In planning a long time program, the only practical basis for future action is what has happened in the past.

In making this comparison, Chicago is taken as the representative American marketing center; and Liverpool and Winnipeg are taken as representative foreign centers. Since Liverpool is generally recognized as the leading world market center, the Liverpool price is the best indication of the world price trends. Winnipeg, the chief marketing center of Canada, is chosen as the other marketing center because the Canadian producer is the chief competitor of the American producer. Winnipeg is chosen for the further reason that the bogy of cheap Canadian wheat has been the favorite argument in selling our traditional protectionist policies to the Middle Western farmer. The effectiveness of this argument in bringing in votes is generally recognized. The effectiveness of the tariff policy in assuring the American farmer a good price for his product is in the realm of "much heat and little light."

TABLE VIII. THE AVERAGE CASH PRICE OF WHEAT AT CHICAGO, WINNIPEG AND LIVERPOOL 1911-35

Year	Chicago	Winnipeg	Liverpool
1911	94	99	112
1912	94	92	114
1913	89	89	106
1914	111	129	157
1915	114	113	175
1916	157	188	224
1917	228	224	235
1918	234	224	240
1919	227	238	215
1920	216	189	223
1921	128	130	151
1922	113	112	144
1923	106	100	127
1924	139	166	181
1925	161	151	176
1926	140	146	163
1927	138	149	152
1928	117	113	128
1929	130	123	129
1930	84	72	80
1931	53	57	59
1932	53	52	54
1933	94	72	68
1934	102	76	81
1935	101	76	80
Avrge(a)	129	128	143

Department of Agriculture, Statistical Abstract, 1936.
(a) Averages calculated from data for entire period.

Table VIII is a summary of the average cash prices at Chicago, Winnipeg, London for the period from 1911 to 1935. This table gives a quick picture of the relative price situation at these centers. Despite the fact that it costs several times one cent to ship a bushel of wheat from Winnipeg to Chicago the average difference in the price at the two points is one cent. Clearly the Canadian producer is not de-

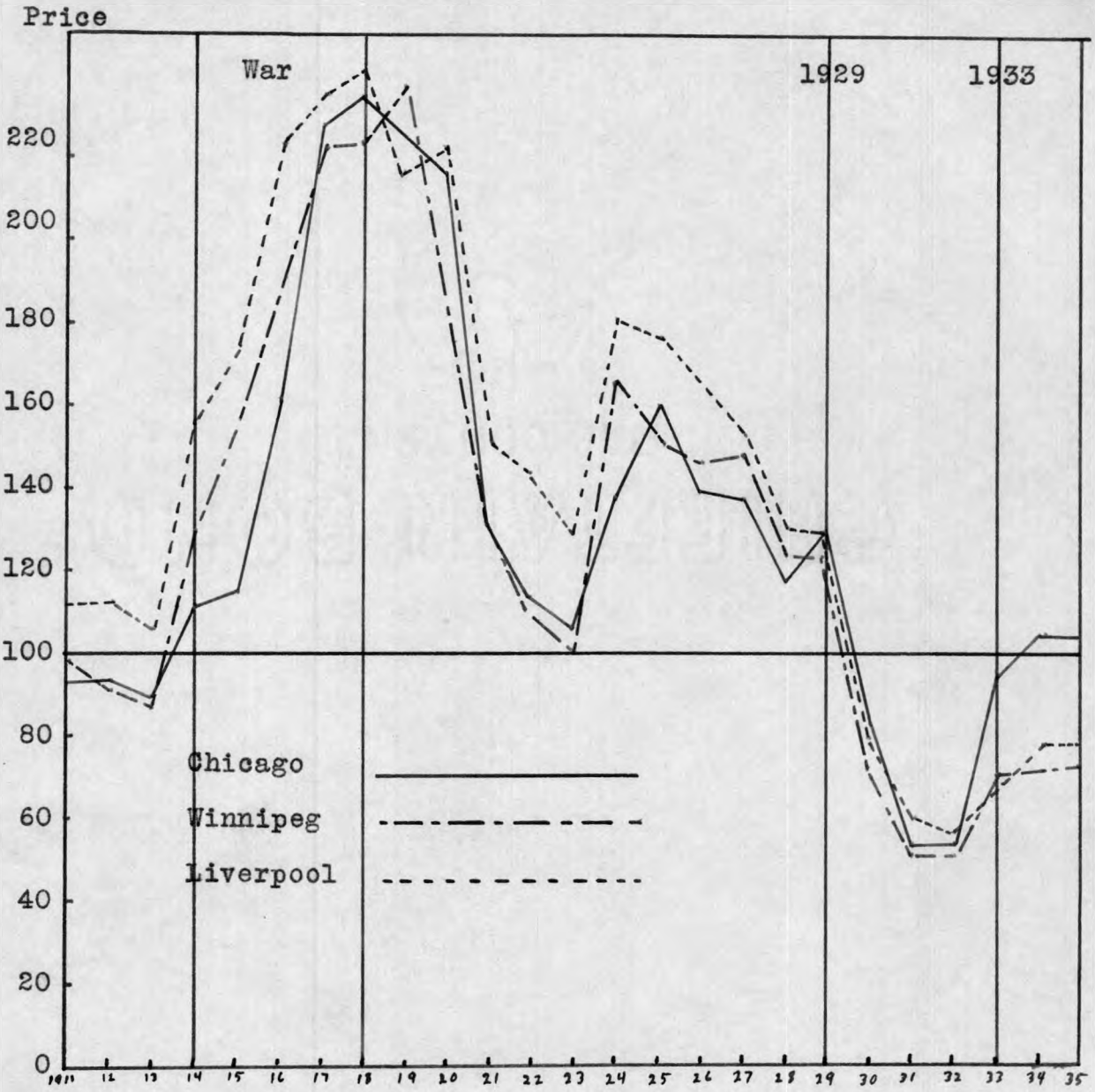

Figure 6. Average Cash Price by Years in Chicago, Winnipeg and Liverpool from 1911 to 1935 (a)

Source:-- Data presented in Table VIII.

(a) Price is expressed in cents per bushel.

pendent on the United States market for an outlet for his wheat.

The dominance of the Liverpool market is shown by the margin between the average Liverpool price and the average Chicago and Winnipeg prices. Clearly the price in both these markets is in reference to the Liverpool price rather than to the other. If either the Chicago or the Winnipeg market were dependent on the other, there would be a differential between the two points equal to the cost of shipping from one point to the other. Thus "Cheap Canadian Wheat" goes the way of George Washington's hatchet and the wings of Icarus.

Averages are sometimes misleading. For this reason the data of Table VIII are plotted on a graph in Figure 6. There is a striking congruency of the three lines. Clearly, until 1933, the price of wheat in the United States was dominated almost solely by world conditions and the manipulations of tariff had no more effect in raising prices than the proverbial raindrop in the ocean. Undoubtedly the high tariff produced many votes for the Republican party, but it is difficult to see where it brought any dollars into the pockets of the grateful farmers.

Upon closer examination it is seen that the Winnipeg price was higher than the Chicago price in 1911, 1914, 1916, 1919, 1921, 1924, 1926, 1927, and 1931. It was equal or substantially so in 1912, 1913, 1915, 1922, and 1932. This contradiction between fact and propaganda has been known to economists all the time. The United States, as an exporting nation,

has had an export market and this means that American wheat prices have been fixed by world market conditions entirely out of the reach of the manipulations of the tariff riggers, no matter how sincere the intentions of the tinkerers might be or how completely the farmer might trust their ability to protect him from the menace of cheap foreign wheat.

We have all heard the story of how the Federal Reserve Board met in Minneapolis sometime in 1920 and decided it was time to deflate the farmer, bringing about the precipitous drop in prices that occured in the fall of that year. The behavior of the lines of the graph, showing the coincident crash of prices in the three centers in 1920 and 1921, would indicate either that the story is a pretty fable, or that the Twelfth District Federal Reserve Board must have wielded enormous influence in Winnipeg and London!

Twice during the 25 years covered by Figure 6 the United States price moved upward relative to the world trend: once, in 1929 and 1930, when the price pegging operations of the Farm Board offered a temporary support to the market; and again, in 1933 to 1935, when the combined influence of the production policies of the Agricultural Adjustment Administration and the drouth placed our wheat industry on a domestic basis, permitting the tariff to take effect in bolstering the price level. These are the only times in the entire period when the United States price is significantly higher than the price in other world market centers.

Figure 6 presents a clear picture of the economic cycles

between 1911 and 1935. Here are clearly shown the normal nature of the years immediately preceding the war; the war time inflation which carried into 1920; the post-war depression of 1921-1923; the boom years of "Coolidge Prosperity"; the Depression; and the return to more normal price conditions following 1933. In the downward movement of the price lines from 1925 onward we see the basis of the rising bitterness of the farmers toward the price situation. This early downward trend in a basic industry while other industries were enjoying a general boom was a significant warning of the fools' paradise in which we were living and of the rude awakening that was about to take place.

In conclusion let us see what the 24 cent differential of the 1933, 1934, and 1935 prices means in terms of our domestic wheat policy. Assuming a normal crop of 789 million bushels at the Winnipeg price of 75 cents, the total crop value would be 592 million dollars. Again, assuming a "domestic need" crop of 625 million bushels at the Chicago price of 99 cents, the total value of the crop would be 619 million dollars, a difference of 27 million dollars in favor of the smaller crop. This leaves out account the further net gain arising out of the lower cost in terms of seed, labor, and investment of the smaller crop. It may be noted that the actual crop in 1935 was 623.4 million bushels, very close to the domestic need. Some may call this the economics of scarcity, but whatever it is called, the fact remains that farmer is trying to make money farming and is hardly to be blamed if he adopts the program that brings him the largest net return.

PART III

WHEAT PRODUCTION IN NORTH DAKOTA

CHAPTER X

ASPECTS OF THE NORTH DAKOTA PROBLEM

North Dakota is by tradition and fact a wheat producing state. With 18 per cent of its total land area planted to wheat,[1] and with an average crop of 94 million bushels,(a) North Dakota shares with Kansas the distinction of being the leading wheat producing state. Particular significance attaches to the North Dakota production because it accounts for nearly one-half of the entire spring wheat production of the United States.[2] This is a specialized product which often commands a premium in the market because of the demand by the American housewife for a flour whose special bread making properties depend on the high protein content of spring wheat. This gives the North Dakota crop an importance out of proportion to its ratio to the total production of the United States.

To establish a basis for the study of the North Dakota situation, Table IX presents a tabulation of the acres harvested, the yield per acre, the total yield, the average price in North Dakota as of December 1 of each year, and the total crop value for each year from 1911 to 1935. At the bottom of the table are presented the computed averages for each of

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1. Yearbook of Agriculture, 1922, p. 594
2. Yearbook of Agriculture, 1935, p. 355

(a). Table IX. p. 66.

TABLE IX. ACRES HARVESTED, YIELD PER ACRE, TOTAL YIELD, PRICE PER BUSHEL, AND VALUE OF WHEAT CROP IN NORTH DAKOTA FROM 1911 TO 1935

Year	Acres Hrvstd	Yield Per Acre	Total Yield	Price (Dec. 1)	Total Value
1911	9.3	8.5	79.2	89	71.5
1912	9.2	16.0	147.0	69	101.4
1913	9.3	10.5	97.4	73	71.1
1914	9.0	11.0	99.0	101	100.0
1915	9.9	17.0	159.3	87	138.6
1916	8.4	6.0	50.6	152	76.9
1917	8.2	7.5	61.8	200	123.6
1918	9.0	11.5	103.3	203	209.7
1919	9.1	6.7	61.0	241	147.0
1920	9.8	8.8	86.2	130	112.1
1921	10.7	8.2	87.7	85	74.5
1922	9.4	13.8	130.3	90	117.3
1923	8.4	8.2	68.9	86	59.3
1924	8.7	15.3	132.7	126	167.2
1925	9.2	12.5	115.5	131	148.7
1926	9.1	8.6	77.7	117	90.9
1927	10.3	12.9	133.5	103	137.5
1928	10.8	14.4	155.5	81	126.0
1929	10.4	9.6	99.9	98	97.9
1930	9.9	10.8	107.3	51	54.7
1931	6.3	6.5	41.0	46	18.9
1932	10.6	10.4	110.4	32	35.3
1933	10.1	7.1	71.3	70	49.9
1934	3.4	6.1	20.9	98	20.5
1935	7.8	7.0	54.7	92	50.4
Avrg(a)	9.1	10.2	94.0	106	96.0

Source:--Official Estimates of the Division of Crop and Livestock Estimates, Department of Agriculture, 1936 (Fargo, N. D., Office)

(a) Arithmetic averages of the data within respective columns.

these items for the period are stated. Because of weighting effects the product totals do not coincide exactly with their factors. That is, 9.1 times 10.2 is not exactly 94 and the product of 94 and 106 is not exactly 96. This is not a serious deviation but should be noted for the information of the

reader.

There is a rather wide variation in the acres harvested from year to year. We cannot assume that this is the result of the vagaries of planting by the farmers, but rather that it results from the varying amounts of crop abandonment on account of such factors as rust, drouth, and insects. Incidentally column 1 throws considerable light on the marginal nature of North Dakota agriculture. A significant fact of column 1 is that the period of heaviest acreage coincides with the beginning of the rise in carry-over to abnormal heights.

Our comments on the national situation regarding price apply here. It is a picture of widely varying price levels that adds a further erratic note to the already unstable nature of North Dakota's leading industry. One factor in the table that should be noted is that these prices are quoted prices and do not reveal the heavy loss in the black rust years resulting from the low grade of most of the wheat grown.

In order to interpret more readily the facts of Table IX, three graphs are shown. The first graph, Figure 7, is a step graph showing the average yield per acre for each year. Two facts stand out on this chart. First is the erratic character of the yield per acre from year to year. It is a picture of highly speculative industry in which the vagaries of weather produce a highly unstable economic condition. The full significance of the low yields is not shown in that there is usually a heavy abandonment of acreage in the years of low yield.

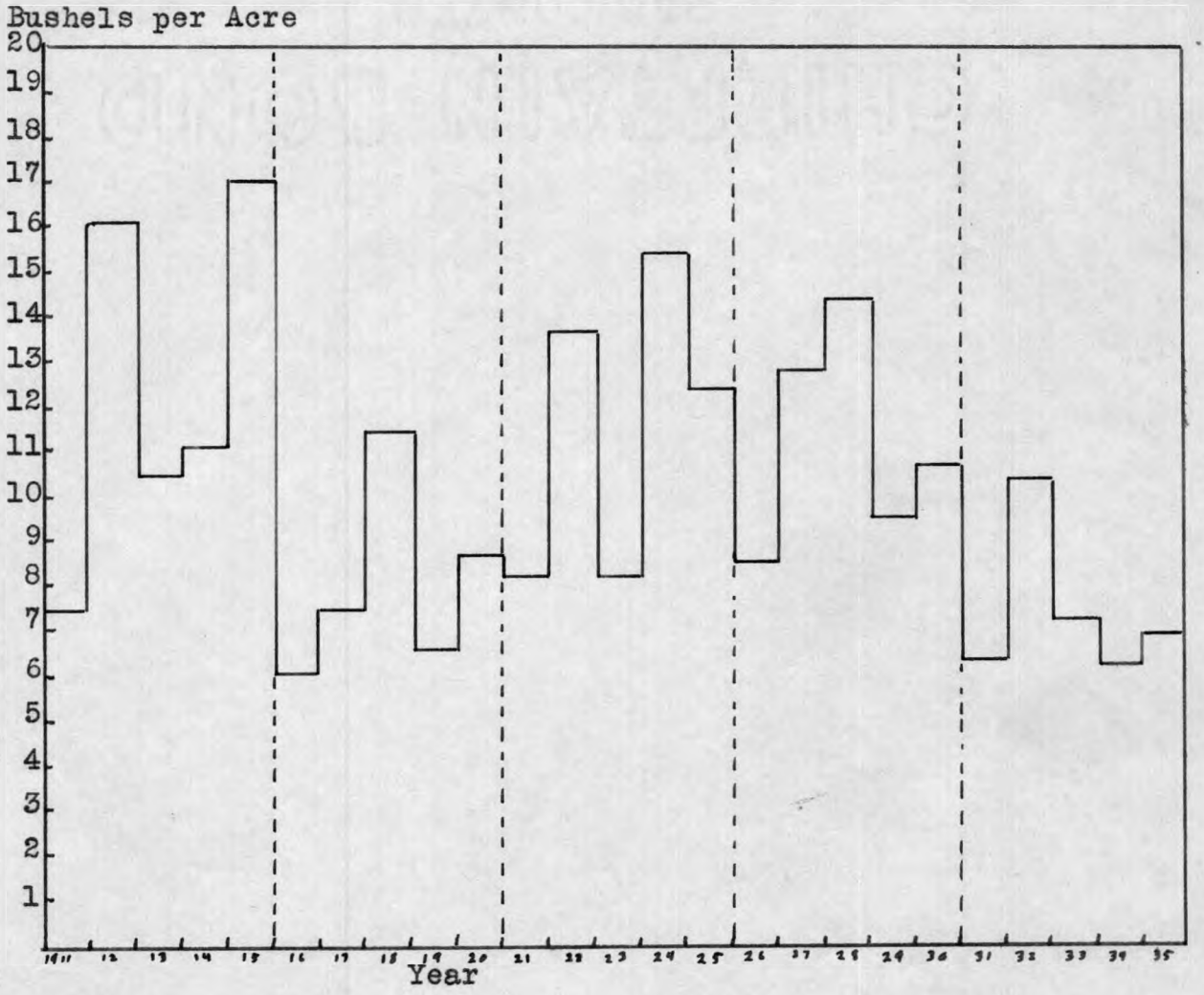

Figure 7. Average Yield per Acre by Years in North Dakota from 1911 to 1935

Source:-- Data presented in Table IX.

The second fact that stands out is the progressive decline in the yield per acre throughout the period. It is a situation in which the peaks and the valleys grow lower from year to year with a pronounced downward trend. It carries unpleasant implications for North Dakota agriculture. If this trend should continue for another 25 years we should find the state with a wheat crop approaching the vanishing point. Here is food for serious thought.

That "bumper crop" the hope which keeps the farmer planting year after year in the face of drouth and other disaster, appears as a rather infrequent occurence. There are only five of these peak crops in the entire 25 year period. This is an average of only one in five years. The grouping of these five crops in two groups reduces the normal expectancy for such a crop to a less than one-in-five probability.

A picture substantially similar to this and which also takes into account the factor of the varying acreage is presented by Figure 8. Figure 8 presents the total yield by years in a step graph. Two production peaks, one in 1915 and the second one in 1928 are shown. Figure 8 does not give such a clear picture of decline as Figure 7 because the one million acre increase in total crops in the late 20's tends to offset the declining yield so far as total bushels are concerned. It does show however the low productivity of the years of poor crops. The poor crop years were climaxed in 1934 when North Dakota produced only 20 million bushels of wheat, a crop only one-fifth of average. In the face of this erratic

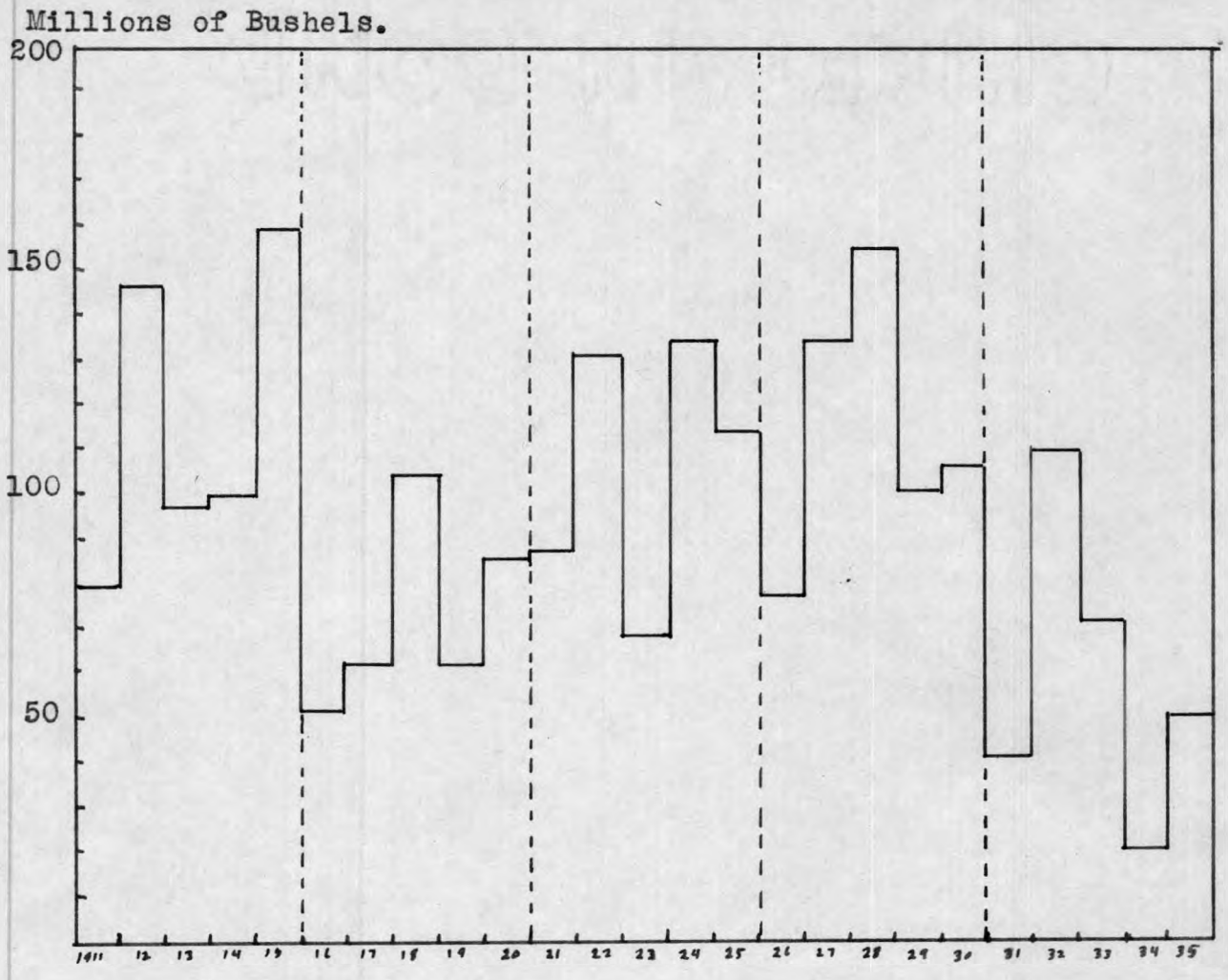

Figure 8. Total Yield in Millions of Bushels of the North Dakota Wheat Crop from 1911 to 1935

Source:-- Data presented in Table IX.

and declining yield it becomes easier to understand the wide spread discontent and discouragment of the farmers in North Dakota. Though it is clearly a productivity decline it is easy to understand the restless desire to fasten the blame on someone.

A vivid and convincing picture of the disaster that has befallen North Dakota is given in Figure 9. Figure 9 shows the total crop value from year to year. The coincidence of the nine per cent above normal crop of 1918 with the peak of the war prices brought the value of that crop to an all time peak of over 200 million dollars. The fluctuating prices of the middle 20's tend to iron out some of the production differences giving a picture of prosperity for a few years.

The falling fortunes of the state are shown by the uninterrupted decline in crop value from 1924 to 1931 with no important revival thereafter. The tragedy of 1932 was that, despite a crop running 16 million bushels above average, the total return was 35 million dollars, slightly more than one-third of normal. The continuing misfortunes of the recent years are shown in the six year period of low value beginning in 1930.

Of these three graphs, Figure 8 probably is the most significant. Presenting, as it does, the combined results of acreage and yield totals it gives a good total picture of North Dakota's wheat productivity trends. Removing the expansion factor of the increased plantings of the later 20's

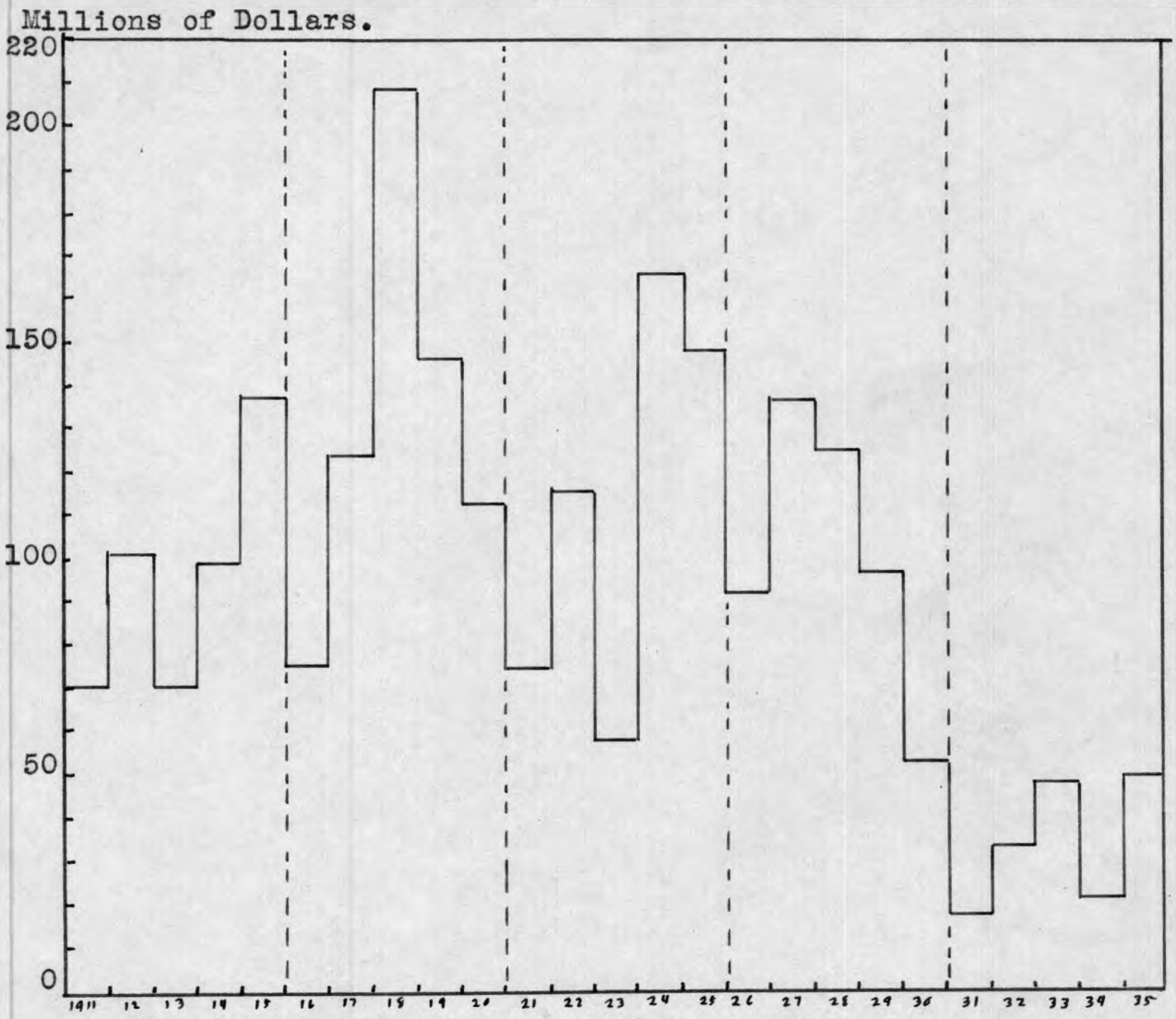

Figure 9. Total Value of Wheat Crop in Millions of Dollars in North Dakota from 1911 to 1935

Source:-- Data presented in Table IX.

it is a picture of decline.

The incentive to increase production because of higher prices in the 20's, plus the increased use of power machinery which released feed land for cash crop production, are the principle factors contributing to the increased production. A group of good years brought a considerable amount of small scale bonanza farming, especially in the western part of the state where there was an abundance of cheap and unimproved land. The writer, in personal investigations and travel which has included most of the state, has observed a considerable expansion of rather large-scale wheat farming resembling the one crop farming of the early days of the Red River valley area. It is a speculative, machine agriculture which pays enormous profits in good years; but in the nine years since 1928 it has practically bankrupted itself.

The problem of North Dakota agriculture is a two-fold one. First is the problem of production; second is the problem of a stable market. Both problems are largely out of the control of North Dakota by herself. The production problem is one of weather and the various other tricks that nature can conjure up to plague the life of the prairie farmer. An added menace to the future of North Dakota is the slowly falling fertility of the thin soil of the part of the state lying outside the Lake Agassiz area.

The problem of price is tied up with the national price problem. North Dakota, alone, is not in position to bring about favorable changes in the market situation. Though North

Dakota's 94 million bushels of wheat does represent 12 per cent of the total normal crop, it is an amount that falls far short of controlling the market. In any program to secure a more equitable price level the North Dakota grower must necessarily cooperate with the growers in the rest of the United States.

PART IV

SUMMARY

CHAPTER XI

A REVIEW OF THE FACTS

Chapter I stated thirteen questions pertinent to the field of this study. These questions have been answered in the intervening chapters. Following is a summary of the answers.

1. The normal production of wheat in the United States is 788.9 million bushels.
2. The normal domestic consumption of wheat is 625 million bushels, divided as follows: for human food, 475 million bushels; for seed, 75 million bushels; and for livestock feed, 75 million bushels.
3. The consumption of wheat is not responsive to a significant degree to changes in either price or in the general economic well-being of the people.
4. The reduction of the annual per capita consumption of wheat for human food has offset the gain in population with the result that the total annual consumption today, with a population of 128 million, is approximately the same as in 1911 when the population was 93 million.
5. Until 1927 the export trade was a regular and dependable outlet for the excess of production over domestic needs.

6. The normal annual carry-over is 130 million bushels.
7. With the loss of the export market following 1927 there was a rise of the theretofore stable carry-over to 400 million bushels. By 1935 the carry-over had returned to the nearly normal figure of 150 million bushels.
8. Until 1933 the Winnipeg and Chicago prices were nearly equal. Until 1933 the Liverpool price averaged 14 cents higher than the Chicago price. After 1933 the Chicago price has been higher than the Liverpool price.
9. Until production in the United States was placed on a domestic basis in 1933 the tariff policy has no effect in raising the price of wheat in the United States.
10. Since 1933 the American price has shown a favorable average difference of 24 cents.
11. A change in the seasonal marketing policies of the growers would be of little value. Such a change would reduce the already small season differential to the point where the added cost of the different marketing practice would erase the small gain in price.
12. The trend in North Dakota production has been toward an increased acreage, accompanied by a decline in the yield per acre.

CHAPTER XII

WHAT OF THE FUTURE?

This study would be meaningless unless it can be shown to throw light on the fundamental problems of the wheat industry of the United States permitting the setting up of a basis for a sound national policy for the wheat industry.

The writer believes that such a basis has been established by the facts brought out in the study. The United States has a normal production of 789 million bushels of which 20 per cent is normally exported. This exportable margin has placed the domestic wheat market on a world price basis as shown by the comparison of prices in the three important world centers. Assuming that the world price is an adequate return to the American producer, and assuming further the continuation of the world market as a disposal factor for the American product, it would be entirely feasible to maintain production at the normal, or even a higher, level.

The facts contradict the first assumption. The average index of farm costs from 1921 to 1933 was 143.[1] At the same time the index of grain prices was 106,[2] a difference of 37 in favor of the cost index. The conclusion from this difference in index numbers is that the world price level does not afford the American farmer a return from his product on par with the economic return of other economic groups.

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1. Yearbook of Agriculture, 1936, p. 1151. (calculated by averaging the index nembers of the last column of Table 7)
2. Yearbook of Agriculture, 1936, p. 1152 (Table 8)

Turning to the second assumption, the continued availability of the foreign market, we find that the foreign market declined from 1928 onward and by the peak of the depression it had disappeared entirely. Combining these two contradictions of the assumptions, both of which contradictions point in the same direction, the conclusion is inescapable that we cannot depend on the foreign market to absorb a surplus production. The reasons for the disappearance of the foreign market are complex, and cannot be investigated at this point, but the disappearance of the foreign market is a fact having significant applications to the American wheat industry.

The wisdom of the continued exploitation of our soil resources in the production of materials for the export market is open to serious debate, but this is a field that is likewise out of scope of this study.

The alternative to disposal in the foreign market is controlled production based on the domestic needs. Certainly a nation with the ability to produce its own wheat and much more should not depend on the foreign market for its supply. Adjusting our production to domestic needs would call for an average reduction of 20 per cent in production. How to bring about such a change is a difficult problem. Voluntary individual control is impossible. Reductions by one group would be offset by increased plantings by others, seeing an opportunity to capitalize the improved prices their neighbors' production control policies would be expected to bring about. Because of this, any control measure adopted would have to

be national in scope and cooperated in by most of the producers. The Agricultural Adjustment Administration attempted such a nation-wide control program. The effectiveness of reduced production in bringing higher prices has been shown in Part II. We are not justifying the policies of the Agricultural Adjustment Administration in detail, but the facts show that reduced production on a nation-wide scale does raise prices.

If the 30 per cent gain of the domestic price level over the world level can be maintained by control policies, a basis has been laid for substantial gains to the farmers. If the land thus removed from wheat production were conserved by the production of other crops and by other land conservation policies there would be a shift from speculative and exploitive agriculture to an agriculture based on the long time necessity of conserving our soil resources and assuring an adequate food supply for future generations.

North Dakota, as shown in Chapter X, ties in closely with the national picture. The decline in our production shown by Figure 7 points strongly toward the wisdom of the course suggested.

In conclusion we point out that the real marketing problem of the farmer is the year to year variation of price, rather than the variation from month to month in any one year. With proper safeguards to assure a continued supply of wheat adequate to our domestic needs, the production control program could eliminate the erratic price movements which have so nearly ruined the wheat industry.

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