An Economic Study of Wheat Prices

by

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PREFACE

The primary purpose of this thesis was to familiarize the writer with some of the factors to be considered in a study of wheat prices. It seemed advisable to survey the subject rather than concentrate study on a particular phase. Therefore, the material presented herein includes elements beyond the scope of strict wheat price analysis.

Consideration has been given to the following topics: aspects relating to a study of prices, causation of prices, the marketing of wheat, price determination in the marketing process, wheat prices and the general price level, devaluation and the price of wheat in five countries, the relation of supply and production to price, differential price behavior among the classes of wheat, seasonal variation in wheat prices, prices of wheat products, international trade in wheat, foreign, agricultural policies in regard to wheat, and wheat production.

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INTRODUCTION

A study of prices, whether pertaining to an individual commodity or a group of commodities, must necessarily recognise certain fundamental conditions arising from personal or group activity in the process of satisfying the diversified wants of human kind. These numerous wants are satisfied by the possession and utilisation of goods and services.

In our system of national economy, private property, extensive natural resources and profit motivation have led to the development of intricate machinery for the satisfaction of wants. In the process of development, our economy has been transferred from one of barter to one of exchange. The division of labor and exchange economy is the natural outgrowth of a desire for ever increasing efficiency through the utilisation of specialised mass production.

Economists and businessmen divide the process of production into the utilisation of four factors: land, labor, capital and management, resulting in the production of goods and services. The division of the results of the utilisation of these factors has long been a problem of economic interest. Land for its share receives rent; capital receives interest; labor gets wages; and management takes the profit or loss as the case may be.

Consumption is the process of utilising the products of production in the satisfaction of wants. Both consumption and production are necessary for distribution.

Some goods, producers goods, are used for further production; they are often called the durable goods. Those goods which are produced for consumption are designated consumers goods. Farm machinery is a durable good, while milk, eggs and butter are consumers goods.

The production of goods creates a need for distribution in order that the product may be delivered to the potential consumer. In developing an efficient system of distribution, it has been necessary to provide facilities for contacting buyers and transporting the product.

A continuous desire for increased efficiency developed a system of specialized production. Instead of each family unit being self-sufficient, we have attained a degree of specialization. At first, this led to the development of a process of barter in which goods produced by an individual were exchanged for those produced by others. The barter system of exchange resulted in serious difficulties as our economic progress continued. If, for instance, an individual specializing in the production of cows, desires a horse, he must find someone who has a horse and is willing to trade the horse for a cow. If the horse and cow are not equal in value in the estimation of the traders, and if nothing can be offered "to boot" to equal the difference, the difficulties are magnified. Complications resulting from the use of a barter system in an increasingly complex economy led to the adoption of a medium of exchange. Instead of the producer of cows attempting to find an individual who desired

to exchange a horse for a cow, and one who owned a horse of the same value as the cow, he would now sell his cow and receive an amount of the medium of exchange. With this he could buy a horse or any other commodity he desired. The medium of exchange was called money.

Many different commodities have been used as money at one time or another. The Indians used wampum and early settlers used furs. In the Virginia colony, tobacco was used as money and to control its value production restrictions were introduced.

To be useful as money, the commodity so chosen must be of general acceptability and thus pass freely from hand to hand. Other qualities of a good medium of exchange are, "high specific value, durability, value as a commodity, portability, homogeneity, malleability, and stability and uniformity of value".[1/] If any requisite of a good medium of exchange can be differentiated as most important, stability of value is in all probability that quality.

Money has at least three important uses: as a measure of value, as savings and deferred payments, and as a medium of exchange. Keeping in mind the qualities of a good money, one can readily see the reasons for using the more valuable metals. Several metals have been used in the past, but in modern times gold and silver have been employed by most nations. Although gold and silver more nearly approach the ideal for money, they are subject to changes in value

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1/ Ely, Richard T. Outline of Economics.

due to variations in their supply and demand just as other commodities.

As modern civilization has progressed, other things beside metallic money have been developed to facilitate exchange. These instruments of credit have lessened the demand for metallic moneys and greatly expedited exchange transactions.

It may be well to look at some of the reasons for exchange between individuals and nations. Among the reasons, we find that differences in natural advantages; climate, resources, geographical location, etc., are important factors influencing the desire to trade. The advantages derived from the most efficient combination of the factors in production are important, as well as those resulting from education and training. Among other things, variations in tastes, abilities, and customs of individuals and nations are conducive to exchange.

The system of exchange or trade gave rise to numerous facilities and agencies for the distribution of goods. Among the important ones are clearing houses; commodity, stock, and produce exchanges; international banks and money markets; transportation agencies; numerous types of middlemen; and governmental promotions of foreign and domestic trade. In general, the cost of distribution is the difference between the price received by the producer and that paid by the consumer. This margin includes charges for distribution facilities used to increase the value of the commodity.

ASPECTS RELATING TO A STUDY OF PRICES

The importance of prices and price changes is far reaching. Every human being living in the civilized world is affected by fluctuations in the prices of goods and services. To the farmer, adverse price fluctuations are generally at the bottom of his serious maladjustments. The businessman likewise can see profit and loss in the change of prices. Very few things have such a general affect on the attitudes, actions, and well-being of a people as do prices and their movements. One reviewing the history of a nation is impressed with the association of price fluctuations and economic welfare. In periods of rising prices business prospers; people are optomistic about the future, and the economic problems which were burdensome during periods of distress are hidden. During periods of declining prices business activity lessens, pessimistic attitudes are noticeable, and maladjustments arise. Irrespective of the causes of price movements, the affects on economic and social progress are evident.

Value and Price

Value, as referred to in this study, means the ability of a commodity or group of commodities to exchange for other commodities. The value of a commodity is determined by its exchange command over other goods. For example, at a particular time 10 bushels of wheat may exchange for a pair of shoes. Later on, 20 bushels of wheat may be necessary to exchange for a pair of shoes. Without introducing

price, it is evident that in terms of shoes the value of wheat has fallen 100 percent, or it may be said that the value of shoes in terms of wheat has increased 100 percent. The supply and demand for shoes in relation to the supply and demand for wheat has obviously changed. Considering only the exchange value between these commodities it is impossible to determine which has fallen in value and which has increased. To determine the degree which each has changed, it is necessary to compare wheat's ability and the ability of shoes to exchange for other commodities. If later, wheat is exchanging for only one-half the volume of other commodities, it is clear that the value of wheat has fallen in terms of shoes and other commodities. If shoes are exchanging for twice the volume of wheat and other commodities, it is evident that shoes have risen in value in terms of wheat and other commodities.

When speaking of price, one attempts to measure value (exchange) in terms of the commodity or thing used as money. Price is a ratio or relative between a given amount of a commodity and the media used as money.

If the value of wheat and shoes as discussed above is expressed in terms of money, the result is a price for wheat and a price for shoes. The expression of these values in terms of money introduces another factor, the monetary unit.

Prior to devaluation in the spring of 1933, the dollar was an expression of money equal in value to 23.22 grains of fine gold, in

other words, the price of an ounce of gold was equal to $20.67.

When the price of wheat is equal to one dollar a bushel, it means that at the particular time the value of wheat is exactly equal to the value of the dollar or 23.22 grains of fine gold (prior to devaluation). If the price of wheat changes to $1.50 a bushel, the value of wheat is equal to one and one-half times the value of the dollar. The value of wheat and the value of the dollar may both change.

The dollar, in the case of the United States, is an arbitrary name given to an amount of the commodity used as money. The fact that the dollar and an amount of the commodity used as money are the same, or the fact that the arbitrary name is given by a government does not give the unit a miraculous stability of value. The value of the dollar is as stable as the commodity it represents.

Measuring Prices and Price Changes

The world we live in is one of relationships. We think and speak in terms of relatives, continuously comparing one thing with another.

Measurements are also relative. When we say the price of wheat is low, we have in mind its price in relation to some other date or relative to something else.

One of the great advances in recent times in price analysis has been the introduction of index numbers for the measurement of prices and price changes. An index number of the price of a given commodity is a statistical measurement by which prices at a given time are compared with those at another time, which is the base period. The

base period is designated as 100 percent and variations from the price in this period are shown accordingly.

If, for example. the average price of No. 1 Northern Spring wheat at Minneapolis for the month of July during the five years 1910-1914 was $1.02 per bushel, and the average price in July, 1931 was $0.61, the index number of the price of wheat in July, 1931 would be 60 ($61 \div 102 \times 100 = 60$). Relative to the price in July 1910-1914, the price of wheat in July, 1931 was 60 percent.

An index number of the prices of a number of commodities may also be computed; each commodity may be given a weight according to its relative importance, which results in a composite index. In recent years almost all aggregate or composite indexes of prices of many commodities are weighted by some measure of relative importance.

The use of indexes in price work facilitates comparisons between commodities expressed in different units, as well as comparisons between prices of the same commodity at different periods of time or valued in terms of different units of currency. Index numbers have limitations and one must be careful not to attach importance to one that has been incorrectly calculated.

Types of Price Movements

There are four types of price movements common to most commodities.

1. Secular trend.- This movement is characterized by the smooth, long-time trend of the statistical series. In prices it

refers to the tendency of a series to exhibit a growth or decline over a long period of time. "Such a trend may be in a constant direction, may change direction at a constant rate, or may be even characterised by abrupt shifts in direction or rate". 1/

Secular trend is measured by free-hand and mathematically calculated curves. In a statistical study of prices this tendency for prices to change over long periods of time must be "eliminated" if one is to study the short-time movements.

The secular trend in prices may be due to two causes: (1) changes in the value of the monetary unit, and (2) changes in the value of commodities.

2. Cyclical movement.- This movement refers to the periodical wave-like change which may be noticed in a graphic picture of a price series. Some of the most common examples of this are the price cycles of livestock. The cyclical movements may vary in length but many times the changes have been of such regularity in the past that they are worthy of study.

In certain industries such as building construction, automobile, textile and others, there are definite cyclical movements of activity. In wheat prices there is little definite tendency for cyclical movement of the type found in livestock, but similar movements are noticeable and are measured usually not by definite periods of time, but in relation to periods of high and low prices. 2/

1/ Mills, Frederick C., Statistical Methods, Henry Holt and Co., New York. Revised Edition, 1938.

2/ Green, R.H., Seasonal and Short-Time Fluctuations in Relation to the Wheat Price Cycle, Tech. Bul. 39, Kansas State Expt. Station, Sept. 1935.

3. Short-Time or Year to Year Movements.- Price movements of this type are common and are attributed mainly to the supply and demand conditions influencing price. This movement is irregular in its magnitude and appearance.

Each type of price movement is found in combination with others. The price of wheat at a particular time is influenced by forces causing secular trend, cyclical movement, year to year changes, and seasonal variation.

The short-time movements may be influenced by random factors such as wars, strikes, floods, etc., which do not occur at regular intervals. This movement is the type which lends itself readily to analysis and it is reasonable to believe that this is a reason for the relative large amount of study which it has received.

4. Seasonal Variation.- Seasonal price movements are characterized as those which are found within a twelve month period and which re-appear each year. Certain of the agricultural commodities have a distinct seasonal variation. Others have little, if any, definite seasonal tendencies. Many of these are influenced by the factors influencing the year to year fluctuations and the seasonal variations are dominated by these movements.

These commodities which exhibit seasonal fluctuations vary greatly in their conformity in individual years to the average over a period. 1/

1/ Waite, Warren C. and Cox, Rex W., Seasonal Variations of Prices and Marketings of Minnesota Agricultural Products, 1921-1935, Technical Bulletin 127, Minnesota Agricultural Experiment Station.

CAUSATION OF PRICE MOVEMENTS

Causes for price changes may be divided into two groups, those common to all commodities as evidenced by changes in the general level of all prices, and those relating to individual commodities as portrayed by the fluctuations of the price of a particular good about the general price level.

The factors responsible for movement in the former are quite different from those causing the latter. The price of a particular commodity is thus affected by two groups of forces, those causing changes in the general price level and those responsible for fluctuations about this level. It should be remembered that these price making forces do not act separately, but are constantly at work in the determination of the market price of a good.

The term "general price level" does not express a price level separate and distinct from that of the commodities of which it is composed. It is rather a composite of the prices of many commodities, each being acted upon by the price making forces, some of which are similar and cause all commodities to portray similar trends. The forces common to all commodities may not be identical with respect to their affect on individual commodities. The prices of some commodities may be falling, while others are rising, and the use of an index number to express the general price level results in an averaging and combining of the price changes of individual commodities.

To measure changes in the general price level, index numbers have been prepared by both public and private agencies. Various types of

commodities have been included and different methods of calculation used. Usually a group of commodities which are assumed to be representative of changes in the price level are chosen and weighted according to their relative importance. To be representative the commodities included must be of such a nature that they respond to the forces responsible for common commodity price movements. The type of prices used must also be dependent upon their response to the factors influencing the general price level. Wholesale prices, according to some authorities, seem to satisfactorily meet this requirement.

Among the wholesale prices there are certain ones which, due to characteristics of production and distribution, do not respond to forces responsible for changes in the general price level. In our present economy, we find in certain industries practices which tend to limit price fluctuations in the goods produced. Instead of the practice of increasing production and selling the product at a price resulting from an adjustment of supply, demand and other factors, these industries administer a set price and limit their production to the amount which will be demanded at this price.

Another reason for so-called "sticky prices" common to many industrial commodities is that of the inflexible costs in production. Those commodities which are in the process of fabrication do not fluctuate in price as do the basic or raw material commodities. As a commodity gets closer to the ultimate consumer in passing through processing and distribution channels price fluctuations become less violent. The stage of processing is important in tending to lessen the violent price changes so noticeable in the raw materials.

Contrasted with the practice among certain industries to limit price fluctuations is that found in the production of raw materials such as agricultural products. In agriculture, competition is relatively free and no attempt is made by the farmer, other than through government subsidy, to limit his production. Instead he tries to produce a maximum and the result is a sale of the product in a market where supply, demand and other factors finally adjust themselves in a price. In agriculture natural conditions are responsible to a large extent for the total production of commodities, especially in the case of grains and other crops.

Of the index numbers in common use today to measure the general price level, that calculated by the Bureau of Labor Statistics of the United States Department of Labor is probably the most widely used. It includes 784 commodities and the prices are those at wholesale. This index does not fluctuate as violently as does an index of basic commodities. Many of the commodities of which it is composed are of the "sticky" type, and are not greatly influenced by changes in the value of money. During periods of rising prices, basic commodities increase in price more rapidly than all commodities, and in a period of declining prices, basic commodities fall more rapidly than all commodities. 1/

1/ See Figure 5.

The Price Level and the Value of Money

The price level, as well as individual prices, is continuously changing. When prices rise, the amount of money necessary to purchase a volume of commodities increases. In other words, the exchange value of money for goods becomes less. It is often said when prices are high money is cheap. By this is meant that relative to other commodities the commodity used as money has become less valuable.

When prices of goods decline, more commodities may be purchased with a unit of money. In other words, fewer units are required to buy the same amount of goods. The common expression becomes "dollars are dear". The value of the commodity used as money has increased relative to other commodities.

The exchange value of money is thus the reciprocal of the general price level. As the price of an individual commodity is the ratio of the value of the commodity to the value of the commodity used as money, so is the general price level a ratio of the value of all commodities to the value of that used as money. As the supply and demand for goods governs their value, so does the supply and demand for money govern its value. Upon these points it is probable that most monetary authorities agree.

In the statement that the supply and demand for money governs its value, there is at least one word which has been given varying interpretations. The various theories proposed to explain changes in the value of money have given various inclusions to the term "money".

Some writers believe that the money-of-account is all important in any consideration of the value of money. Money-of-account, according to Doctor Keynes, is that in which debts and prices, as well as purchasing power, is expressed. He relates that the money-of-account is the primary concept of a "theory of money". "Money itself, namely that by delivery of which debt-contracts and price contracts are discharged, and shape of which a store of purchasing power is held, derives its character from its relation to the money-of-account, since the debts and prices must first be expressed in terms of the latter."[1/] It is this latter money which is used for convenience as a medium of exchange for spot transactions.

Doctor Fisher defines money as "what is generally acceptable in exchange for goods".[2/] This definition includes actual cash money, negotiable instruments, other means of credit and anything else which is generally accepted in business transactions. It is this definition which is usually implied in the pure quantity theory of money, as expressed in the relationship of the quantity of money in circulation, its velocity of circulation and the volume of trade.

Doctors Warren and Pearson in their work "Gold and Prices" refer to money as a medium of exchange. "Whatever performs this function, does this work, is money, no matter what it is made of, and no matter how it came to be a medium at first, or why it continues to be such."

1/ Keynes, J. M., A Treatise On Money, Volume I, Harcourt, Brace and Company, New York.

2/ Fisher, Irving, The Purchasing Power of Money, MacMillan and Company, New York, 1931.

Sometimes money is defined as standard money, meaning that which is taken as the basis upon which a monetary system functions, for example, gold or silver. All other money (that which is generally accepted besides gold and silver) is then expressed as mere substitutes representing the standard money and used for convenience.

As defined by Professor Kemmerer, "the kind of money which independently embodies this unit (monetary) and to which the values of the other kinds of money are assimilated or adjusted is called the standard money." 1/ He also refers to three broad classes of standard money: first, commodity money, that which has a commodity value and a money value practically the same; second, standard fiduciary money, that which has a money value greater than its commodity value; and last, that standard money which has a bullion value greater than its money value.

The Value of Money

Although it is realized that this is no place for a detailed review of the proposed theories for explaining changes in the value of money, it seems advisable to mention a few of the most important points in connection with certain ones.

Generally speaking, the importance given to credit and its direct affect upon the value of money seems the cause of greatest disagreement among many economists. Although this may be true, a great number of minor details are continually being interpreted

1/ Kemmerer, Edwin W., Money, MacMillan Co., New York, 1937.

differently by various men.

The Quantity Theory

The quantity theory of money in its modern form was first prepared and interpreted by John Stuart Mill, who collected the ideas of the earliest writers and formulated them into a definite statement. The following is a quotation from his work. "If we assume the quantity of goods on sale and the number of times these goods are resold, to be fixed quantities, the value of money will depend upon its quantity, together with the average number of times each piece changes hands in the process. The whole of the goods sold (counting each resale of the same goods as so much added goods) have been exchanged for the whole of the money, multiplied by the number of purchases made on the average by each piece. Consequently, the amount of goods and of transactions being the same, the value of money is inversely as its quantity multiplied by what is called the rapidity of circulation." 1/

In the form of an equation this is reduced to MV = PT, were M is the quantity of money in the community, V is the velocity of circulation, P is the price level and T is the total amount of goods sold.

Doctor Irving Fisher in his book on "The Purchasing Power of Money" has developed a more detailed explanation of the quantity theory in regard to the value of money. He enumerates five groups of causes for fluctuations in the purchasing power of money; "money,

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1/ Mill, J. Stuart, Principles of Political Economy, edited by W.J. Ashley, Longmans, Green and Co., New York, page 494.

its velocity of circulation, deposits, their velocity of circulation, and the volume of trade." Their relation in the form of an equation is $MV + M'V' = \Sigma p\,Q$. In this equation M is the amount of money; V its circulation, M' the amount of deposits, V' their circulation, p the price of a good and Q the quantity exchanged or the volume of trade of the good. Σ is the summation of all the individual p times Q transactions. In his analysis of the equation and its components, Doctor Fisher concluded that the volume of credit funds (M') has a relationship to the volume of coin or legal tender money expressed as M, that the velocity of circulation of money and deposits tends to increase with an increase in the volume of trade (T), and any two or more of the five factors "may be indirectly related by virtue of being dependent on a common cause or causes."

Another theory, which has been proposed by various men since the days of Alfred Marshal, is that of cash balances. This theory is similar in many respects to the quantity theory, except that special emphasis is placed on the demand for money rather than its supply. The advocates of this theory believe that the willingness or desire for people to hold money has the greater affect. In contrast to the quantity men, they think that the demand for money, distinct from the indirect demand for goods, depends upon the total amount of stocks of money held by individuals. While the quantity theorists begin their explanation of the value of money by the amount spent, the believers in the theory of cash balances begin with the money that was not but held as reserve purchasing power.

According to this theory the price level is dependent on two sets of forces, the amount of cash balances and the quantity of real balances. By cash balances is meant the money which may be created by banks and held by them in the form of deposits. Real balances refer to the amount held by the individual and depends upon his desire to withdraw or make deposits and borrow. The volume of cash balances depends upon the action of the bankers and the real balances are dependent upon the desires of the depositors.

"The price level is the resultant of the two sets of decisions and is measured by the ratio of the volume of cash balances created to that of the real balances created." 1/ The volume of real balances again refers to "the amount of wealth forfeited through holding money."

When the prospect for rising prices is evident the amount of cash balances may decline due to consumers desire to buy commodities instead of holding money. When there is a prospect for a fall in prices it results in people postponing buying. This may result in an increase in cash balances.

The following quotation will give the reader an insight into the reasoning behind the theory of cash balances and its relation to the price level. "On the other hand, prices might also be forced upward if the desire to hold balances should decline at a time when the quantity of money was constant. Let us suppose that the average individual should decide to reduce his balance from $500 to $250, i.e.,

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1/ Keynes, J. M., A Treatise on Money, Harcourt, Brace and Co., New York, Volume I.

from one month's to two week's normal expenditure. Naturally every one would immediately spend the excess of his present balance, but since there is no diminution of the quantity of money, these spendings will automatically augment somebody else's balances, who in turn will promptly spend the excess. Prices will rise until, when equilibrium is finally reached, the general price level will have doubled and the average cash balance would still be $300. But the real balances would have been reduced by one-half." 1/

A detailed theory developed by Doctor J. M. Keynes begins with the flow of money income to various members of a community and the way the income is spent. It has its basis in a consideration of income, investment and savings. According to this development, the general price level depends upon the monetary costs of production, plus or minus an amount found by considering the "relative money values of new money saving and new investment." 2/

The Relation of Gold to Prices

Writers at various times have shown the affect of an increased supply of gold on the general price level. In recent years reliable statistical data have been collected and presented in sufficient quantity to give an adequate picture of the true relationship.

1/ James, F.C., Economics of Money, Credit and Banking; Ronald Press Company, 2nd Edition.

2/ Keynes, J. M., A Treatise on Money, Volume I, Harcourt, Brace and Company, New York.

The work on this subject conducted by Doctor Warren and Doctor Pearson of Cornell University, has been of the most interest. The discussion which follows is based principally on the material found in their book "Gold and Prices", 1935 Edition, while portions of it will be supplemented by information obtained from other sources listed in the bibliography of this thesis.

Before continuing with this discussion, it might be well to briefly review the meanings of value and price. As stated previously, the value of a commodity is determined by its exchange command over other goods, while price is a ratio or relative between the value of a good and the value of the commodity used as money. If the standard money is gold, the price of a particular commodity is the ratio between its value and the value of gold.

Before devaluation in the spring of 1933, the dollar contained 23.22 grains of fine gold. Every exchange transaction between dollars and goods was equivalent to an exchange of 23.22 grains of gold for each dollar's worth of goods. It made no difference whether money or credit instruments were used in completing the actual spot transaction; in any case it was equivalent to the use of standard money (gold). The use of credit instruments such as notes, checks and paper currency are for convenience and each represents the standard money. The use of an instrument of credit, as a substitute, lessens the demand for standard money, and under a gold standard is similar to an order for gold, which in all probability, would not be consummated because of modern banking and clearing house transactions, and the knowledge by the owner of the

order that gold may be obtained if desired. As long as the currency of a country is on a gold basis, the value of the unit of currency is the value of gold. The value of the order (instrument of credit) would be the same as the value of standard money (gold).

The price of the commodity used as money is set by governmental authority and is diverse from its value. Its price states the relationship between the abstract name of the unit of money (dollar, franc or pound) and the commodity upon which the monetary system is based. If gold is the standard money then the price of gold is its relation to the monetary unit. For instance, prior to devaluation in the United States in 1933, the dollar was equivalent to 23.22 grains of fine gold or an ounce of gold was equal to $20.67. After devaluation had been completed, the relation of the dollar to gold had been changed and now the dollar is equivalent to 13.7143 grains of pure gold or an ounce of gold is equal to $35.

Increasing or decreasing the relationship between the dollar and gold does not directly change the value of gold, instead it changes the relationship between the quantity of dollars which will exchange for an ounce of gold. Increasing the quantity of dollars which will exchange for a given amount of gold decreases the value of the dollar in exchange for goods, the value of gold and goods remaining the same.

As previously stated, the general price level is a ratio of the supply and demand for commodities to the supply and demand for money. If money is taken to be standard money (gold), then the price level is the ratio of the supply and demand for goods to the supply and

demand for gold. This is assuming that the relationship between gold and the monetary unit is not changed. If the price of gold is changed another factor is introduced.

The relation of the world supply of monetary gold to world production of goods has been demonstrated by Doctors Warren and Pearson. "For 75 years before the World War, world monetary stocks of gold had to increase at the same rate as the world physical volume of production in order to maintain stable commodity prices in England. If gold stocks increased more rapidly than other things, prices rose, if they increased less rapidly, prices fell." 1/ This statement has been substantiated by much data. The same relationship was found by J. Kitchin as reported in "The Supply of Gold Compared With the Prices of Commodities", Interim Report of the Gold Delegation of the Financial Committee of the League of Nations. This relationship does not take into account the demand for gold.

Since the World War, the relationship of gold supply to the production of goods has not explained all the fluctuations in the general price level. Doctors Warren and Pearson have explicated this fact by use of the demand for gold. During the World War period "most of the countries of the world discontinued the use of gold and gave little attention to gold supplies. Gold moved to the few places where there was a market for it. Even the gold that did not move lost value. The reduced demand for gold made it lose value, or made prices rise in a few countries that remained on the gold basis." 2/ During the war period there was

1/ Warren and Pearson, "Gold and Prices", page 94.
2/ Warren and Pearson, "Gold and Prices", page 104.

created an exceptional demand for goods, while the world physical volume of production fell. Goods were desired instead of gold and this probably had some effect on the relationship.

Another explanation necessary is the fall in prices during the last decade. During this period an exceptional demand for gold was created by many of the countries that had previously abandoned the gold standard but were again returning to it. In April 1924, Sweden returned to a gold basis and six of the most important European nations were again on a gold standard by July, 1926. This led to an increased demand for gold in order to re-establish and maintain a currency basis. These countries desired to restore confidence in their currency and needed to settle debt balances; a large gold reserve was thought necessary for this purpose.

Besides an increasing requirement for gold by governments and central banks, private hoarding demanded large quantities. When a price level has started to decline, a still greater demand for gold is created. When gold increases in value, an individual having assets in that form realises a profit from appreciation. On a falling price level goods become cheap, and there is a tendency to hedge against deflation by transferring to gold.

The gold theory does not attach as much importance to credit as the quantity equation of exchange. In the former, credit exerts an indirect influence by lessening the demand for standard money (gold). An increasing utilisation of credit makes possible a more efficient

use of the supply of gold.

When on a gold standard there is a limit to the amount of credit which may be built on the existing gold base and still maintain specie payments. For example, when credit in the form of paper currency exceeds the proper ratio with gold, or when the existing ratio is endangered by a loss of gold reserve, suspension of specie payments ultimately results, and until such does occur a depletion of the nation's gold supply will take place. The Greenback era beginning in 1861 is an example.

Since the World War extreme maladjustments have occurred in world economic conditions. During this time nationalistic spirits have grown and self-sufficiency has been desired. The enormous destruction of property and life during the war left burdensome debts. Many of the European nations were left as debtors and found themselves in difficulty. Steps taken to increase self-sufficiency have, in many instances, limited trade to a system of barter. The principle of international trade for mutual benefit, based partially on the economic tenet of comparative advantage, has, in many cases, been disregarded.

According to one writer, conditions in the world since the Great War have in a manner resembled those existing early in the 19th century. 1/

England in 1822 had completely re-established her "sterling standard" after a suspension of specie payments in 1797. The

1/ Morgan-Webb, Sir Charles, "The Rise and Fall of the Gold Standard", 1934, MacMillan Co., New York.

sterling standard was a gold standard in which the pound was tied to gold at 3 pounds, 17 shillings and 10.5 pence per ounce. England's importance in world trade and the establishment of a sterling bill of exchange payable in gold led to the recognition of London as a world financial center.

The sterling bill of exchange was similar to a post-dated check. If an exporter in Argentina, for instance, shipped a quantity of goods to an importer in England, he usually desired payment immediately. Usually the importer did not care to pay until the goods were received. Immediate payment fell upon an agency (the bankers in foreign exchange) created for the expressed purpose of settling debts between importers and exporters. In the process the exporter drew a bill upon the importer with his consent, and took it with the bill of lading and other evidences of shipment to the exchange banker who discounted the bill and made payment to the exporter. This bill was then sent to the bank's representative in London. Acceptance by the importer's agent resulted in a declaration that payment would be made in gold or its equivalent when the bill fell due. After acceptance the bill was held by the bank's representative until due date and then settled.

The clearing house in London settled the balances between importers and exporters. Periodically, the net balance or difference between total exports from a country and imports into it was settled. If the imports exceeded the exports gold moved from the country in payment of the difference. The sterling bill of exchange functioned so efficiently that it was used to settle trade balances for all countries. The

large amount of trade handled in London resulted in small amounts of gold passing between nations. The balances tended to be settled by added imports for those countries having favorable balances, and a re-investment in the debtor nations of funds due the creditors.

During a large part of the 19th century, this system functioned smoothly except for those times when certain European nations had credit balances. The four largest creditor countries during these periods were England, Holland, France and Belgium. The creditor position of England was larger than any of the others. Holland, France and Belgium were on a silver standard, and their debtors who had difficulty in continuously obtaining gold made their final balance payments in silver at the current rate of exchange. This method was not possible with England who was on a gold standard.

During this period England was practising a system of protection, which tended to exclude goods from the debtor nations shipping to England in payment of obligations and for the purchase of commodities. Preventing debtor nations from paying their balances with goods resulted in a constant flow of gold to England. This situation steadily grew worse, tended to discourage commerce, caused resentment in the debtor nations, and probably affected the world demand for gold.

After several years, under the protective system, relief was afforded when England returned to a free trade basis. The flow of gold into England lessened and commerce again proceeded in an orderly fashion. Foreign countries were then in position to purchase English goods. The recently developed countries of the New World were able to

sell their commodities on the English market and obtain the necessary bills of exchange, which enabled them to pay their obligations without having to lose gold.

The sterling standard (a gold standard) functioned quite efficiently as a "two way currency", but when the system of protection was introduced, its use as an international medium in the settlement of debt balances was disturbed.

Prior to the World War the United States was a debtor nation, that is, we owed more money abroad than was owed to us. During the war period we made large loans to the Allies, a large amount of which was used to buy goods in this country. Following the war we continued to loan money to Europe until the figure approximated eleven billion dollars. 1/ Almost over night the United States changed from a debtor to a creditor nation. While we were a debtor nation owing balances abroad and our creditors continued to accept payment in the form of goods, we had no serious difficulty in paying our obligations.

After 1929 when American loans were no longer available to the European nations, they as debtors had two possibilities of repaying their debts and purchasing American commodities. They could make payment with goods and services or with gold.

The United States, since an early period, has favored a system of protection in an attempt to exclude foreign commodities which might come into competition with domestic goods. At first, the purpose seemed to be an attempt to aid our industrial units in building a strong foundation. This was probably true in the early years of our nation

1/ Buehler, Alfred G.- Public Finance - McGraw-Hill Book Co., New York.

when agriculture was predominating and industry was in its infancy. The effects of the tariff in lessening the ability of our foreign customers to purchase goods prior to 1929 was counteracted by several factors, among which were the large loans made by the United States.

In 1930 the Hawley-Smoot tariff was passed, increasing the difficulty for foreign countries to sell their commodities in the United States, and obtain credit or money with which to make payments on their obligations and purchase new goods. If goods were to be purchased and debts paid after American loans had ceased, it became necessary for foreign countries to ship gold.

During the period 1920 to 1930 the United States had on an average about 39 percent of the world stock of monetary gold. 1/ In 1937 we had over half the world supply of gold. 2/ Gold supplies in our debtor nations were comparatively small, and deemed necessary in the restoration and stabilization of gold currencies. European nations were not as willing to purchase goods or repay their obligations, when a shipment of gold was necessary. Some of the debtor nations, finding it difficult to make payment with goods, and unwilling to lose all their gold, turned to England who was still maintaining a sterling bill of exchange. These countries dumped goods on the English market and received bills of exchange on London payable in gold, which were turned over to their American creditors. This process encouraged a flow of gold from England to the United States.

1/ Warren and Pearson, op. Cit., p. 151.

2/ United States Department of Agriculture, Agricultural Adjustment Administration, Farm Exports and Farm Imports, C-85-Revised, General Information Series, 1938.

The following is a quotation from the McMillan Commission Report issued in 1931 and giving one insight into the relation between nations of creditor and debtor standing. 1/

"Creditor nations must, unless they are ready to upset the economic condition first of the debtor countries and then of themselves, be prepared to lend back surplus instead of taking it in gold. The first measure towards the restoration of the international price level must necessarily come from the creditor countries. It must consist partly in a greater willingness to lend and partly in a greater willingness to buy. Failing this, the creditor countries will soon have sucked in all the gold available in the hands of the debtor countries, and this may result in serious defaults." Although this report was issued in England, there seems to be considerable "food for thought" in its conclusions.

Factors Affecting Prices of Individual Commodities

Besides the effects upon commodity prices caused by changes in the relation of goods and money, there are those factors which solely influence the price of the individual good and related commodities which have possibilities of substitution. Of these factors, supply and demand are the most important. The supply of and demand for a particular commodity has an influence, which,during a period of stable prices, accounts for most of the fluctuations in price. When the general price level falls rapidly, as in 1930, the affect of supply

1/ See Morgan-Webb, Sir Charles., op. cit. p. 59.

and demand for a good is dominated by the changing price level of all commodities (changes in the value of money).

The price of an individual commodity tends to move with the general price level, the extreme fluctuations away from it showing the influence of supply and demand. When the general price level falls, the price of a basic commodity will fall as part of it, tending again to fluctuate about the general price level at a lower plane.

A stable general price level would not eliminate price fluctuations of individual commodities, but would minimise them by eliminating the individual price fluctuations due to changes in the value of money. The residual fluctuations would be related to supply and demand conditions for the particular good.

Price momentum has an influence on individual commodity price changes. Price momentum refers to the price fluctuations caused by buyers and sellers in determining the market price of a good. Buyers and sellers, especially in those commodities handled on organized exchanges, are always trying to estimate fundamental price determining conditions. In their attempt, price momentum is created.

If a short supply is expected buyers and sellers bid and reject with this idea in mind. There is a tendency to increase prices more than fundamental conditions justify. When the error is noticed prices fall, but below that which would be expected. This continuous over and under shooting finally results in a price balanced by fundamental conditions. The tendency for prices to advance more and fall more than conditions warrant is called price momentum.

Purchasing Power

Various meanings and references have been made to the term "purchasing power". Purchasing power to some people is demand for goods. To others, it is often thought of as the quantity of money which a person can offer for goods. To still others, purchasing power and the quantity of money which may be offered are not synonomous, but that purchasing power is demand for goods, effective by possession of wealth and goods which may be exchanged. They seem to think that the quantity of money, money being only a medium of exchange, does not affect the purchasing ability, although necessary for exchange transactions, but that the goods and property or ownership of wealth is one's true purchasing power.

Purchasing power may be thought of as the ability, in terms of price, of one or a group of commodities to command by exchange another commodity or group of commodities. If wheat is selling for a high price as during the war, without a comparison to other commodities, one might think the purchasing power of wheat had increased as much as the price. However, other commodities also advanced and the true purchasing power of wheat would not be indicated by its price.

To obtain the purchasing power of wheat in terms of all commodities, one must divide the price index of wheat by the price index of all commodities. For example, the price index of wheat at a particular time may be 180 and the index of the prices of all commodities 175. To obtain the purchasing power of wheat in terms of all commodities, the 180 is divided by 175, which results in an index of purchasing power of 103. To obtain the purchasing power of wheat in

terms of basic commodities or the cost of living, a similar procedure is followed. To eliminate changes in the value of money, which is sometimes called deflating the price to a level when money had the same purchasing power as in the base period, the index numbers of the price of all commodities is most commonly used. In this study, unless otherwise stated, purchasing power was computed by this method.

This attempt to eliminate changes in the value of the monetary unit tends to show those price fluctuations due to supply and demand. While there is a tendency for this to result, it is assumed that an index of the prices of all commodities accurately measures changes in the value of money, which is questioned. A price index of basic commodities would probably show these changes more accurately. The index of prices of all commodities is heavily weighted with manufactured products which belong to the "sticky price" group, and do not respond readily to monetary influences.

THE MARKETING OF WHEAT IN THE UNITED STATES

With the exception of holidays, wheat is bought and sold every day of the year. In this discussion, special reference is given only to those areas in the United States where wheat production is important.

The first step in the marketing process is the movement of the grain from the farm to the local country elevator. The country elevator contains storage bins in which the grain is placed until it is again moved toward the terminal market. Country elevators are located near railroad facilities. In certain regions, where wheat production is important, 4 to 6 elevators may be found in a town of 1500 population, each having a capacity of around 40 to 60 thousand bushels. In recent years most of the farm to elevator hauling has been done with motor trucks. Before trucks could be successfully used, most hauling was done with horses and mules.

Based upon ownership, there are three types of country elevators; first, the cooperative or farmer's elevator; second, the line elevator; and third, the private elevator. The cooperative or farmer's elevator is owned and managed by a cooperative association of local producers. The line elevator is owned and controlled by a company, usually located in a large terminal market. The company usually owns many of these elevators in the wheat areas, and thus the name "line elevator." The elevator business is often only a part of the company's interest in the grain trade. In addition, it usually has brokerage offices, memberships in commodity exchanges, and participates in other terminal market

activities. The private elevator is owned and operated by private individuals.

Upon receipt of the grain at the country elevator, a sample is obtained from each truck load. These are graded according to definite standards set up by the United States Grain Standards Act. The wheat is given a class differentiation, an appropriate sub-class and a numerical grade. After grading, the grain is placed in storage bins with grain of like quality. Often times when elevators are not rushed with business, they will clean the grain before shipping to the terminal market. When a carload of grain of similar grade is received, it is shipped to the terminal market. Before arrival the grain is usually graded by government licensed inspectors and given an appropriate grade.

Terminal markets in the United States are located in large cities. The most important terminal market for the winter wheat belt is in Kansas City. The large spring wheat markets are located at Minneapolis and Duluth. St. Louis is an important market for soft red winter wheat. The Chicago market, although an important cash-grain center, receives its outstanding recognition as a futures market. The volume of future trading on the Chicago Board of Trade is by far more than that on all other exchanges combined. In 1929 the Chicago Board of Trade accounted for 83.6 percent of the total volume of trading in wheat futures on all exchanges. 1/ The receipts of actual grain at the

1/ Hoffman,G.Wright, "Future Trading and the Cash-Grain Markets", Circular 201, United States Department of Agriculture.

Chicago market come principally from the other large terminal markets and the grain areas of states located nearby. The principal markets for white wheat produced in the Pacific Northwest are found in Seattle, Tacoma, and Portland.

Three different types of sale are commonly employed by country elevators. Consignment consists of sending the grain in carload lots to commission companies at the terminal markets. The commission firms act as brokers for the country elevators and sell the grain to the highest bidder. In this type of marketing, the country elevator is subject to adverse price changes during the period of transportation from the local elevator to the terminal market unless the risks are transferred. These risks, to a large extent, may be transferred to a group of traders on the commodity exchange by a process known as "hedging". This consists of selling a quantity, equal to the amount of actual grain purchased from the farmer, by sale of a futures contract, and then buying back an equal quantity of futures when the actual grain has been sold. The extent of hedging by farmers' elevators varies considerably from year to year. In a study 1/ conducted in North Dakota, Illinois, Iowa, Ohio, and Kansas, of the 592 farmers' (cooperative) elevators surveyed, 53.2 percent reported no hedging, 21.3 percent reported hedging occasionally, and 25.5 percent indicated that hedging was a general practice. Among the private elevators, 35.8 percent reported no hedging, 32.1 percent occasional hedging, and 32.1 percent

1/ Mehl, J.M., "Hedging in Grain Futures", Circular No. 151, United States Department of Agriculture, 1931.

used hedging as a general practice. This seems to indicate a tendency for private elevators to hedge more frequently than farmers' elevators. It is likely that the line elevators hedge frequently. The owners of the line companies are located in the terminal market and have considerable interest in the futures market. The consignment method of sale is practiced frequently in certain areas, especially in the hard red spring wheat belt. In the hard red winter wheat belt other types of sales are more commonly used.

The second method is sale "on track" at the country point. In this method bids are sent to the country elevators by millers, feed and grain product manufacturers, and others, offering to contract for the purchase of grain of a specified grade and amount. The bid also contains instructions as to loading, billing and date of shipment. When elevators at country points are in position to supply the type and amount of grain desired, these sales frequently result in higher prices.

The third method of sale is "to arrive". In this method "to arrive" bids are sent out to local country elevators by buyers in the large markets based upon prices in these markets. 1/ These "to arrive" bids are definite offers to buy the quality and grade of grain required at a specified price, billing, and date of shipment. In the "to arrive" sales it is usually the duty of the seller to load and bill the grain. The date of shipment may be designated as by the 15th of August, by the 1st of August, after fifteen days from date, or in some similar manner.

1/ Hoffman, G. Wright, "Future Trading and the Cash-Grain Markets, Circular No. 201, United States Department of Agriculture, 1932.

The terminal markets are concentration points for grain produced over large areas which may include several states. They are similar to the country elevators in this respect, except for the size of the area from which they draw. Large elevators are located at the terminal markets, many having capacities of over a million bushels. The grain exchanges located at the large markets function as trading centers. Usually a portion of the exchange floor contains small tables upon which are displayed samples of grain taken from cars in the railroad yards. The members of the exchange representing buyers and sellers gather around the tables, and after inspecting the samples, the buyers offer bids which are accepted or rejected by the sellers. The buyers may represent commission firms, exporters, terminal elevator companies, milling companies, and others interested in actual grain.

Since wheat marketing by farmers is concentrated in the fall and the grain is utilized over the entire year, some middleman must store this grain until it is needed by millers. 1/ Although country elevators store a variable amount from year to year, they are never as important a storage unit as elevators located at the terminal markets. This is especially true in the hard winter wheat belt, while in the spring wheat belt a larger percent of the total crop is stored for a longer period in country elevators.

The terminal elevator managements usually practice hedging. They are not dependent upon securing a profit from a favorable price fluctuation in the relation of cash grain to futures, but derive their

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1/ See Table 28 for indexes of seasonal variation of sales of wheat by farmers.

income from cleaning, mixing and conditioning grain. They also store grain for others and in this case are classified as a public elevator.

The grain which is not diverted into commercial milling channels at the primary markets (those located nearest the areas of production) is moved to the secondary markets. Probably the largest secondary market for wheat in the United States is that located at Buffalo. The wheat which is not utilized at the secondary markets is either exported or distributed to smaller centers of flour manufacture.

The milling of wheat into flour is carried on in many cities throughout the United States, but the largest mills are located at Minneapolis, Kansas City, Buffalo, St. Louis and Portland. In 1937 there were 16 flour mills in operation at Minneapolis, 11 at Kansas City, and 7 each at Buffalo, St. Louis and Portland. 1/

Price Determination in the Marketing Process

In important wheat producing regions of the United States, the price quoted and paid to the farmer is usually based upon the nearest terminal market price. It is probable that these prices paid by local country elevators are influenced by local supply and demand conditions, which cause deviations from the terminal market price other than those caused by the more fixed costs such as transportation and handling charges.

At times the local country elevators may vary their prices paid. They may quote a "card" price which is more than the terminal market

1/ Fifty-Fifth Annual Report of the Minneapolis Chamber of Commerce, December, 1937.

price less cost of transportation and handling. This is done by reducing their operating margins and to obtain a greater volume of trade. Although this practice would not be continued, it does give the elevators who pay the higher prices an increased volume of business at the beginning of the marketing season. Many times when farmers begin to market their grain at one elevator they continue to do so throughout the threshing period. In a country market having cooperative and line elevators, there is usually a considerable amount of competition to secure the greater proportion of the total volume of grain marketed.

Farmers as a rule do not ship their wheat direct to the terminal market, although those who have the quantity to fill a car and better than average quality sometimes ship direct. Usually a farmer having wheat of poorer quality receives a better price by marketing at a country elevator. There seems to be a definite tendency for country elevators to under-grade grain of good quality and over-grade grain of poor quality. During certain years when the crop is below average in quality, a considerable premium is paid for wheat of high protein content.

The futures market is important in relation to cash grain prices.[1/] Many people believe the cash price for wheat is determined by the price of futures. This overlooks the fact that the price of futures is made by the factors determining the price of cash wheat. Fluctuations in the price of cash wheat are similar to changes in the price of futures. This is especially true of the broad movements. The

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1/ The discussion on future trading is based upon information obtained from Future Trading and the Cash-Grain Markets, by G. Wright Hoffman, Circular No. 201, United States Department of Agriculture, 1932.

short-time changes of the two are often quite variable. (Figure 1) The data upon which the graph is based were taken from "Future Trading and the Cash-Grain Markets" by G. Wright Hoffman. The futures prices were adjusted to overcome the difficulty of continuous breaks in price caused by changes from one future month to the next. The following is the procedure used as related in the above mentioned bulletin.

"For this purpose the December futures price for wheat ------each year have been adjusted upward or downward by an amount equal to the average difference prevailing for a period of three weeks at a point where the shift from the December to the May future was made". Similar procedure was followed in obtaining the adjusted price for other futures so as to result in a continuous series for each crop year.

A futures contract is a right to actual grain and under ordinary conditions may be converted into actual grain by either buyer or seller. Consequently, the two series of prices move together. Occasionally, spreading operations tend to keep the series in proper relation. If the price of cash grain, for instance, is above its proper relationship with futures, the spreader will sell cash grain and buy an equal amount of futures. This action on the part of a number of traders would tend to bring the two series back into alignment. After the two series were back in their correct relationship, the spreader would sell the futures he had purchased and re-purchase the quantity of cash grain.

The operations of the spreader may also be conducted between different markets and in various futures. They practice these operations

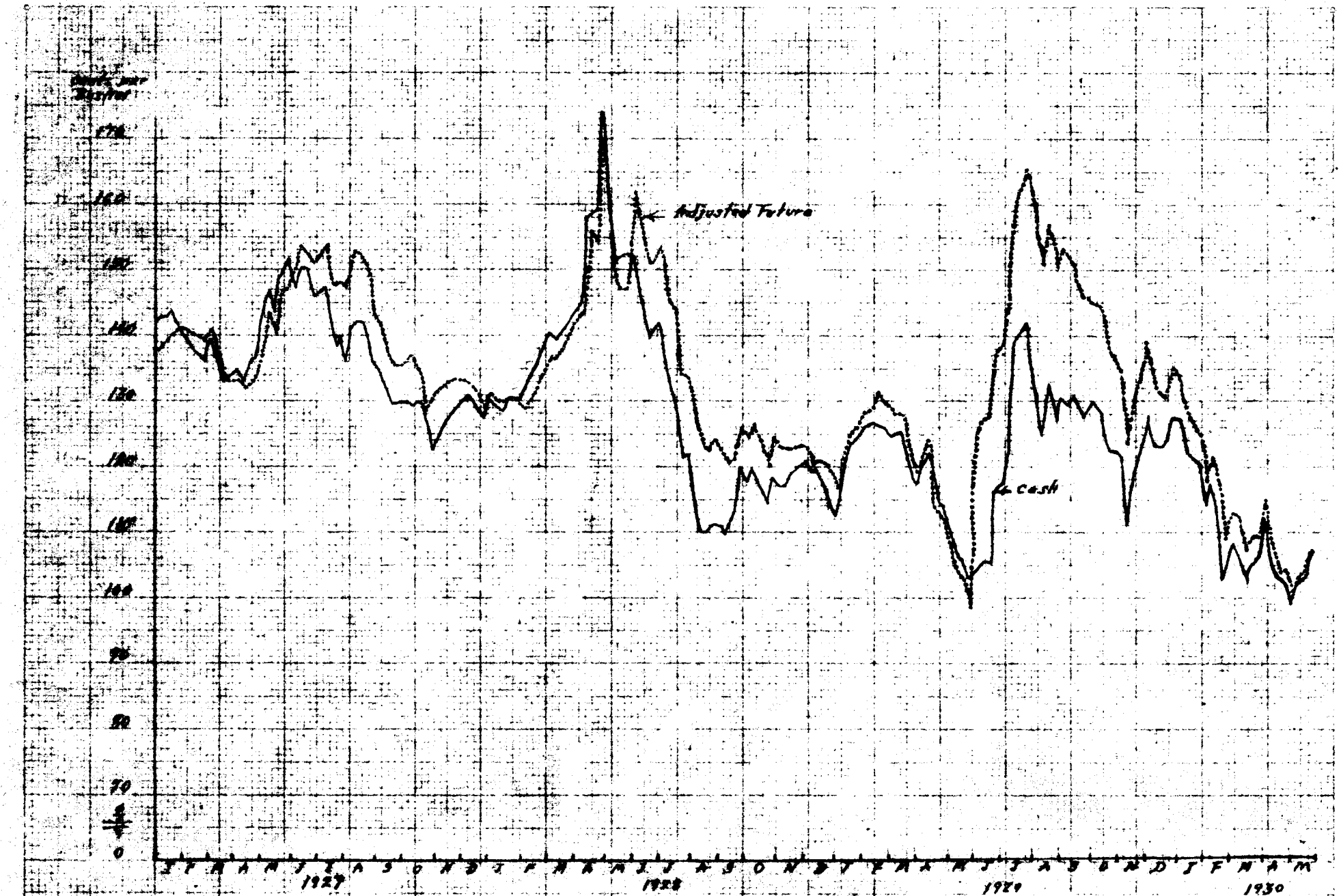

Fig. 1 - Average Cash Price of No. 2 Hard Winter and Closing Future Price for Cash Monday, Chicago Board of Trade, January 3, 1927 to May 26, 1930

Note: See Written Discussion for Method of Adjusting Future Price

when the price at one market or for one future is out of line with the proper relationship between prices at another market. Spreading operations in these instances would also tend to bring prices back into alignment.

Because of the right to convert futures contracts into actual grain, it follows that the fundamental factors which affect the price of futures must necessarily affect the price of cash grain. These factors are usually world-wide and are operating through modern methods of communication. In the grain exchanges facilities for receiving this information are found. Since traders having commitments in the futures market are more interested in price changes than absolute prices, the information received on factors affecting price are first reflected in the futures quotations.

In the sale of cash grain, buyers and sellers on the exchange floor base their bid and asked prices on futures quotations, since the factors influencing price are first reflected in the futures market. This gives the impression that futures prices cause cash grain prices. It is impossible to tell whether, without a futures market, the elaborate machinery for the collection and dissemination of information regarding price making forces would be maintained. Such a market has never existed.

On the highly organized grain markets where prices are very responsive to changes in fundamental conditions, price movements can take place only through a realignment of values in the minds of those who are in position to buy and sell. A factor may have an important affect on current production and thus be a price making force, but

unless it causes those who are buying and selling to increase or decrease their bid and asked prices, it will not cause an adjustment in price. It is thus very necessary that the market be at all times free from inaccurate information. The large markets are not only sensitive to basic conditions but also trading influences.

Although this study does not pertain to the futures market, its relation to cash grain prices is so close that it is desirable to say something about the function of futures prices in the structure of cash grain prices.

Trading on an exchange in grain futures is centered in one month, which is referred to as the dominant future. Wheat trading is conducted in futures which mature in the months of May, July, September and December. The dominant future is that which at any particular time has the largest amount of open commitments. As a result of centering trading in one month, the influence of current market factors are reflected first in that future and other futures "near by or more distant" are than adjusted. The factors influencing the dominant future may not show the same affect on the other futures. Deliverable and total supplies will usually affect the dominant future more than the distant futures. This may also be true of abnormal trading influences.

The futures price is based upon that grade and quality of grain, which when the delivery month arrives will most likely be delivered on the maturing contract. Since various grades are deliverable, some at the basic price, some at premiums and some at discounts, the grade

which may be received on a contract may vary. Although this is true, the grade is determined to a large extent by the deliverable supplies which are available, and in each of the large futures markets some grades are usually more readily available than others, thus lessening the practical variability of deliverable grades.

A trader expecting to make delivery on a futures contract, will attempt to acquire that grade and quality which is cheapest. The possibility of receiving a number of grades and qualities on a contract eliminates to a large extent the use of this method in acquiring cash grain. Usually those interested in the futures market are not in position to take delivery upon a contract, and it is the exception rather than the rule for a contract to mature into actual grain.

The basic price in relation to the futures market is the price of that grade and quality which will, in all probability, be delivered on the futures contract. At the close of the futures month the cash price and the futures price of this grade and quality will be equal. The basic futures price is the base for cash grain price quotations. For instance, on April 1st at Minneapolis, May wheat is selling for 60 cents a bushel. If this price refers to actual grain which will meet the standards of No. 1 Northern Spring and be delivered on contracts maturing in that month, regarding quality only, the cash price of No. 1 Dark Northern Spring, based upon this future, may be bringing 3 cents over the May future, while No. 3 may be bringing 6 cents under. The 60 cents at which May wheat is quoted is used as a base for cash price

quotations, with adjustments being made for any variation in grade or quality as compared to that which is most likely to be delivered on the May contract.

In quoting a cash price based upon that of a future, an adjustment is also necessary for the time element. For instance, wheat is usually worth more on May 1st as reflected by a future than on April 1st, the time of delivery on a cash grain contract. This is due to the carrying charges involved in bringing the grain from the month of harvest to the period of utilization. The carrying charge is a definite amount and is usually known. If the charge for such a service amounts to two cents a bushel, each quotation of the basic price of the dominant future must be lowered by this amount before it is applied to cash grain.

The third element is that of location. The basic price quoted for the dominant future assumes delivery from approved warehouses in the city, or in exceptional cases from cars on track in the railroad yards. Cost of transportation must also be deducted from the basic price to determine the cash grain price.

Suppose a bid was sent out from Minneapolis based upon the December futures price of $1.10. If this basic price assumed delivery of No. 1 Northern Spring and the bid was sent out for No. 1 Dark Northern Spring, the price quoted to the country elevator may be raised by 3 cents a bushel for adjustment for grade. If the bid was sent out on the first of September and the carrying charge from that day to December was one cent, the price quoted to the elevator would be reduced by one cent. This leaves, after considering grade and

time but not location, a net quotation to the elevator of $1.12 ($1.10 + $.03 - $.01 = $1.12). If the bid was sent to an elevator located at such a distance that the transportation and handling charges amounted to 6 cents per bushel, the final quotation to the elevator would be $1.12 - $.06 or $1.06. If this is carried back another step and we assume the operating margin of the country elevator to be 5 cents a bushel, the actual price quoted to the farmer would be $1.01 ($1.06 - $.05).

Although several other considerations affect the final price to the producer, this illustrates the procedure followed in making a price to the farmer.

WHEAT PRICES AND THE GENERAL PRICE LEVEL

Generally speaking, price changes may be divided into two groups, those common to all commodities, as evidenced by changes in the general level of all prices, and those relating to individual commodities, as portrayed by fluctuations in the price of the particular good about the general price level. The price of wheat seems to be no exception to this general tendency.

The longest historical farm price series available for wheat in the United States is that found for the State of Virginia. This series runs back to 1801. 1/ In 1932 Cornell University published a series of index numbers of the wholesale prices of all commodities in the United States beginning in 1797. 2/ (Figure 2) The broad movements of the two correspond closely, especially since 1870. Fluctuations of the price of wheat about the general price level of all commodities is clearly evident. These short-time movements are related principally to factors of supply and demand. When the index of the price of wheat is above that of all commodities, its purchasing power is relatively high.

Various factors contributed to the extreme deviations of the price of wheat from the general price level prior to 1860. From 1801

1/ See Peterson, Arthur G., "Historical Study of Prices Received by Producers of Farm Products in Virginia, 1801-1927, Bulletin 37, Virginia Agricultural Experiment Station, and Young, H. H., "Virginia Farm Economics," Virginia Polytechnic Institute.

2/ Warren, G. F. and Pearson, F. A., "Wholesale Prices for 213 Years, 1720 to 1932, Part I, Wholesale Prices in the United States for 135 Years, 1797 to 1932", Memoir 142, Cornell University Agricultural Experiment Station.

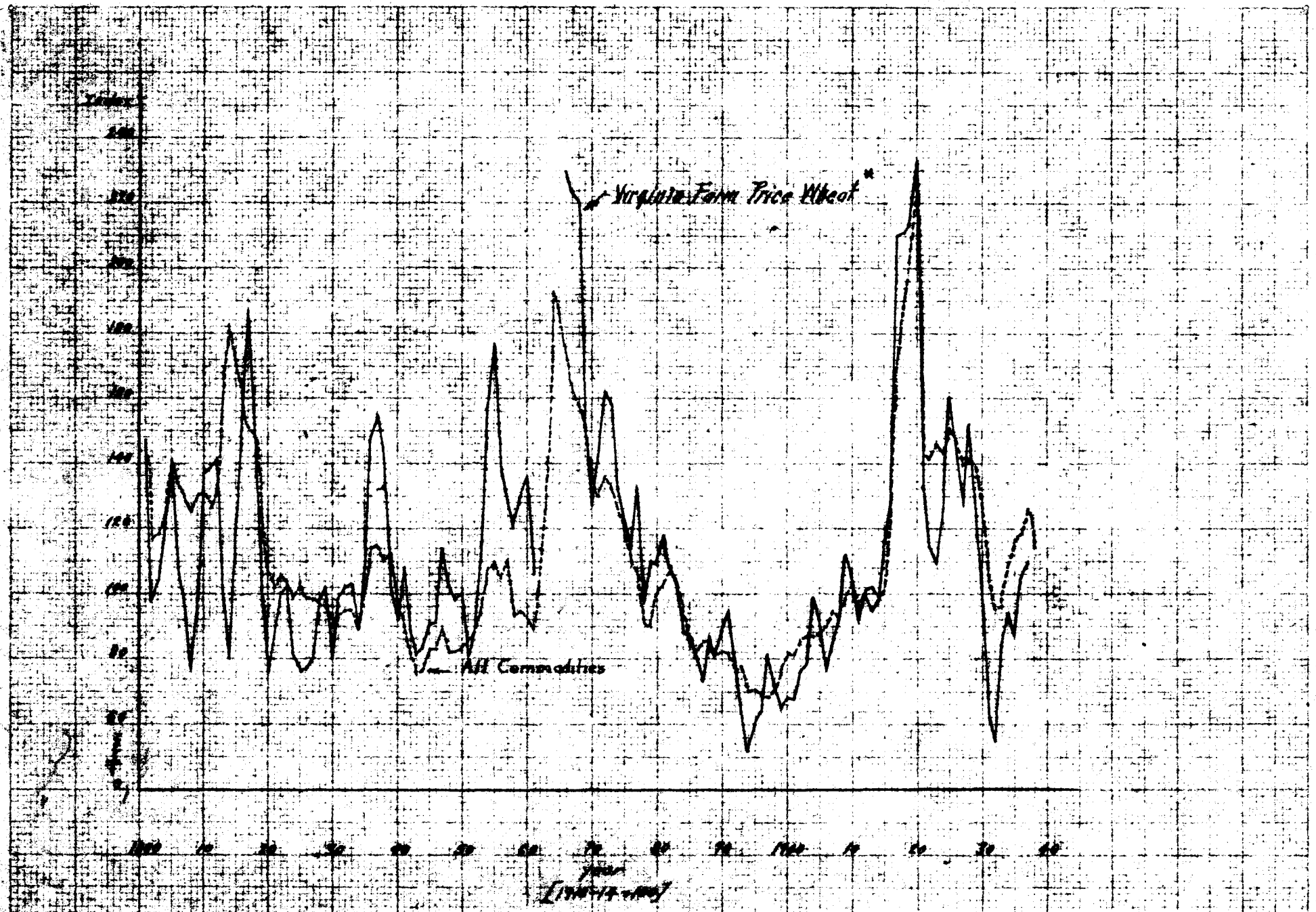

Fig. 2.—Index Numbers of the Virginia Farm Price of Wheat and the Prices of All Commodities, in Currency, 1841 to 1937
* Base period (August 1909 to July 1915)

to 1810 large crops in the United States and in England, our chief importer, along with various governmental acts which interferred with the usual export trade, resulted in relatively low prices during most of the period. With the beginning of the War of 1812, prices increased but the War soon brought a reduction in exports which tended to lower prices. In 1817 prices were high due principally to the increase in exports after the war, coupled with an extremely short crop.

The high prices of 1836 and 1937 resulted from crop failures in 1835 and 1837. During the period 1850 to 1860 short crops, repeal of the English corn laws, the Irish famine, the Crimean War and decreased exports from competing countries gave impetus to rising prices. Although the price of wheat is not available during the years 1862 to 1866, it seems reasonable to believe that it was considerably above the price level of all commodities due to war conditions and short crops at home and abroad. 1/

Since 1870 the price of wheat has corresponded more closely to the changes in the general price level of all commodities. The extreme changes in the prices of commodities during the war period are very noticeable.

The price of wheat of interest to the farmer is the price he receives for the grain he sells. With a given quantity of grain to sell, price alone may not measure "real" income. Real income in this instance means ability to buy as measured by purchasing power.

1/ Peterson, Arthur G., op. cit., p. 26 and 27.

When a change in the general price level occurs, prices of farm commodities being more reactive to factors causing changes in the value of money, respond more violently than do prices of semi-processed products or retail prices. 1/ When prices are rising the price of wheat moves upward more rapidly than the price of flour, which in turn, moves more rapidly than the retail price of bread. 2/

The general price level, as well as the price of wheat, declined from 1875 to 1891 and increased during the period 1897 to 1913. (Figure 2) To further analyse these two periods Figures 3 and 4 were prepared. In figure 3 the December 1st farm price of wheat and its purchasing power are shown. The purchasing power was obtained by dividing the price of wheat by the index numbers of the prices of all commodities on a 1910-14 base. Straight-line trend values were calculated for both series. During the period 1875 to 1891 when the price of wheat was falling, its purchasing power in terms of all commodities remained practically stable, with a very slight upward trend as depicted by the trend line. Based upon straight-line trends, the price of wheat during the period fell at the rate of -3.2 percent of the middle year. 3/ The purchasing power of wheat, in terms of dollars having the buying ability of the 1910 to 1914 period, increased at the slight rate of .4 percent of the middle year. 4/ Although during this period the purchasing power of wheat

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1/ Warren, G. F., and Pearson, F. A, "Gold and Prices", 1935 ed., p. 304.

2/ Figure 45.

3/ $Y = 88.4 + (-2.8)\ X$, (in cents per bushel), origin at 1883.

4/ $Y = 92.3 + (\ .34)\ X$, (in purchasing power), origin at 1883.

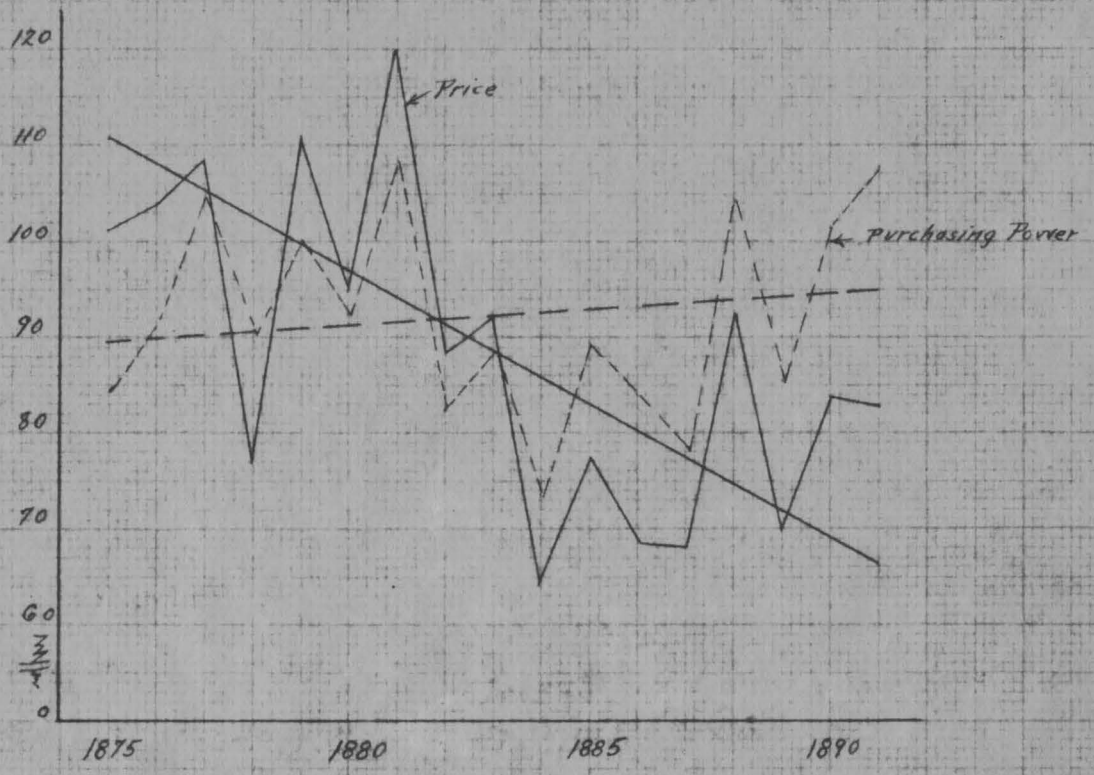

Fig. 3.- Secular Trend of Dec. 1st Farm Price and Purchasing Power of Wheat, 1875-1891

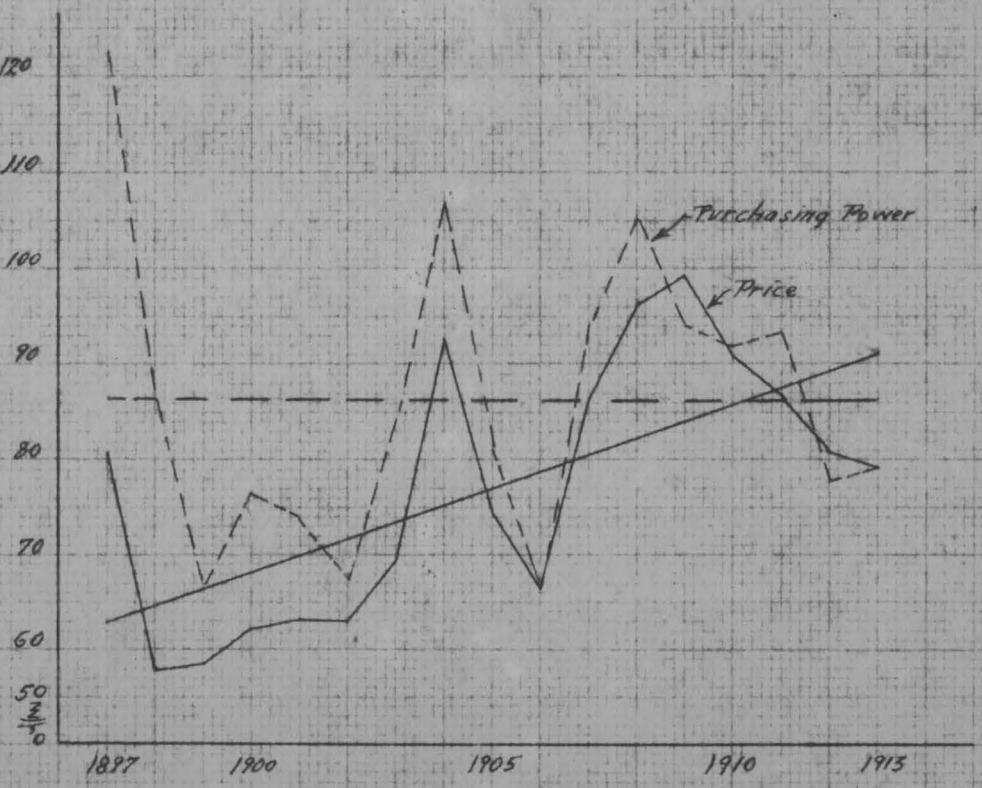

Fig. 4.- Secular Trend of Dec. 1st Farm Price and Purchasing Power of Wheat, 1897-1913

tended to remain comparatively stable, other things accompanying the decline in the general price level resulted in farming, bank, and business failures, strikes, riots, and ill-feeling. 1/ From 1875 to 1891 the general price level tended to fall slightly lower than the price of wheat, resulting in the slight increase in the latter's purchasing power. It is possible this condition was due to supply and demand factors tending to maintain the price of wheat above that of all commodities for a period sufficiently long to result in a slight rise in purchasing power.

The period 1897 to 1913 was characterised by an increase in the general price level with a corresponding increase in the price of wheat. Although the price of wheat increased from a low of 56 cents per bushel in 1898 to a high of 98 cents in 1909, its purchasing power declined slightly over the entire period (Figure 4). Based upon straight-line trends, the price of wheat increased at the rate of 2.27 percent of the middle year. 2/ The purchasing power of wheat during the same period declined at the rate of -.02 percent of the middle year. 3/

1/ Warren and Pearson, op. cit., p. 269.

2/ $Y = 76.98 + (1.75) X$, (cents per bushel), origin at 1905.

3/ $Y = 86.6 + (-.02) X$, (purchasing power), origin at 1905.

The purchasing power of wheat from 1897 to 1913 remained practically stable, but conditions accompanying the period of rising prices resulted in agricultural prosperity, full employment, widespread development of agricultural education, and other governmental services. 1/ Instead of inventories and other assets depreciating as in the former period, they appreciated in value with the rising price level. Profits were easily made and industrial expansion proceeded rapidly.

The Relation Since 1920

In the period 1920 to 1937 the general price level fluctuated violently. Coming out of the war period in 1920, the crop year average of the index of prices of all commodities registered 182, when the 1910-1914 period equals 100. In the years 1921 to 1929 the price level was relatively stable, falling rapidly after 1929 until the same index in 1932 stood at 92. Since that year there has been a gradual increase and in 1937 the index registered 120. 2/

Figure 5 shows the relation between the crop year average index numbers of the prices of 40 basic commodities and all commodities. 3/ When the value of money declines, prices of basic commodities rise faster than those of all commodities and when its value increases, prices of basic commodities fall faster than all commodities.

1/ Warren and Pearson, op. cit., p. 270.

2/ Table 40.

3/ Table 41.

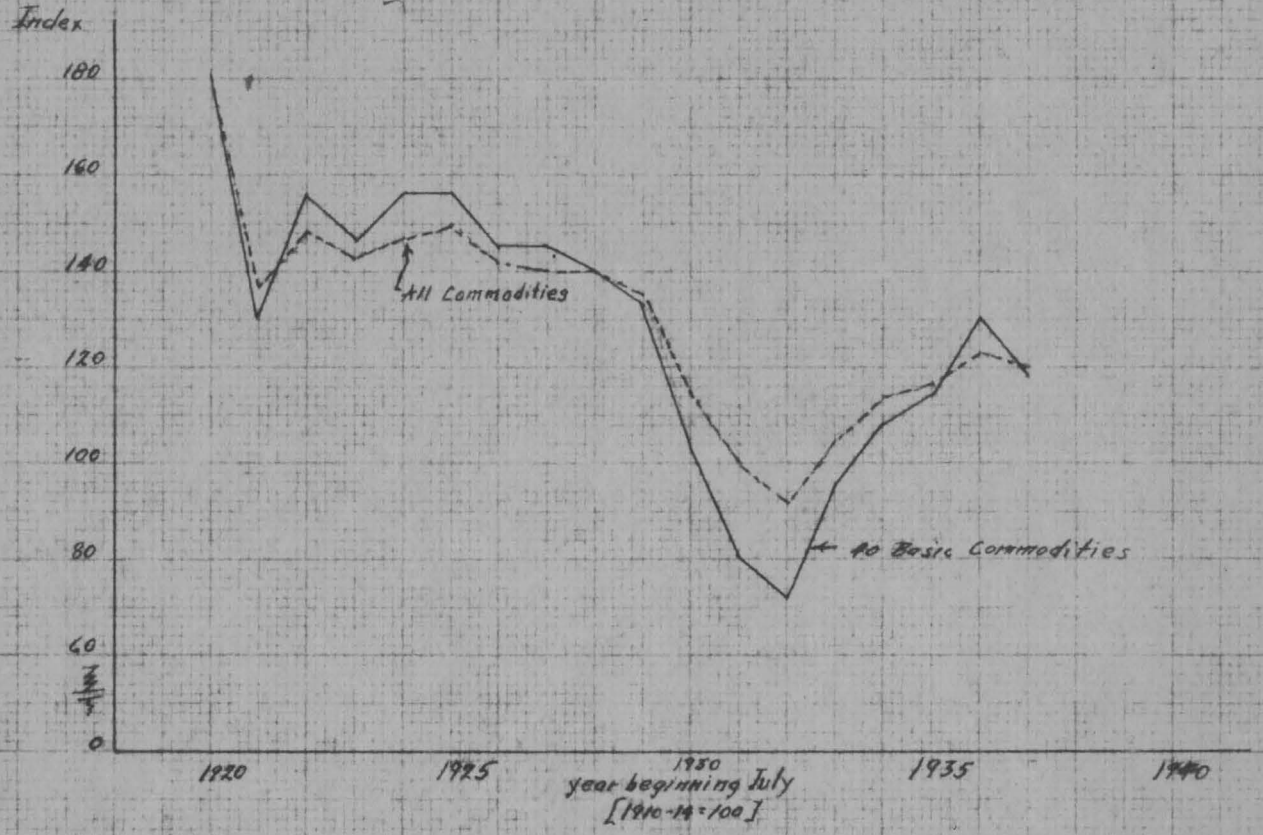

Fig. 5—Index Numbers of the Prices of all Commodities and 40 Basic Commodities in the United States, 1920-1937

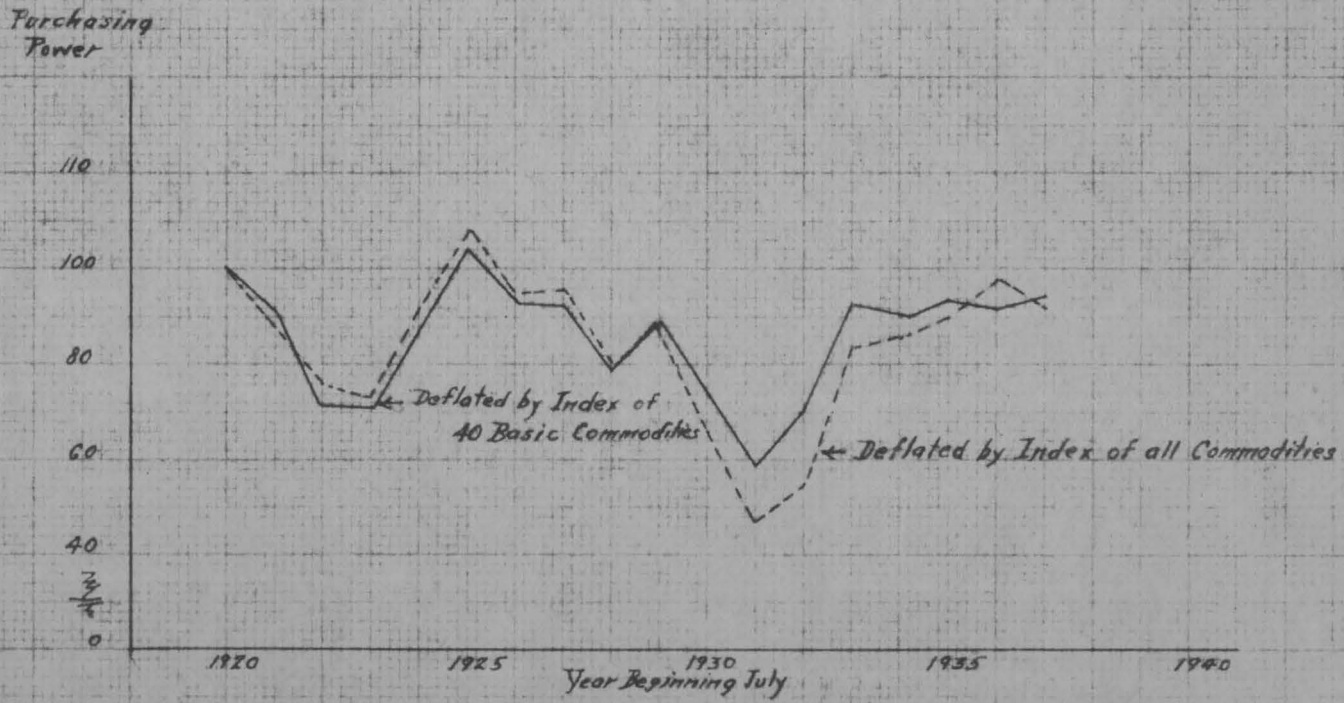

Fig. 6—Purchasing Power of No. 2 Hard Winter Wheat at Kansas City, 1920 1937

To show the effect of deflating the Kansas City price of No. 2 Hard Winter wheat by these two measures of changes in the value of money, Figure 6 was prepared. Although the two measures of purchasing power correspond closely during most of the period, when the rapid decline in prices began in 1929, the purchasing power of wheat as determined by basic commodities was greater than that determined by all commodities. When using basic commodities to obtain purchasing power, less of the fluctuation in price is left to be explained by supply and demand factors. When the general price level is rising, purchasing power calculated by use of basic commodities increases by a smaller amount than that determined by use of all commodities. During a period of falling prices purchasing power, calculated by use of index numbers of the prices of all commodities, falls further than that obtained by using basic commodities.

Figure 7 shows the relation between the crop year index numbers of the prices of all commodities and those of the price of No. 2 Hard Winter wheat at Kansas City. 1/ The general movement of both series is similar. In 1922 and 1923 the failure of wheat prices to correspond more closely to prices of all commodities was probably due to the large world supply of wheat which forced world prices down. In 1925 a small crop in the United States, as well as world influences, tended to raise prices in the United States and other countires (Figure 11). Greater than average world crops and increased carryovers resulted in an accumulation of record world supplies in the period 1929 to 1934. The influence of

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1/ See Wheat Studies of the Food Research Institute of Stanford University, Volume XI, No. 3, 1934, for representativeness of Kansas City prices.

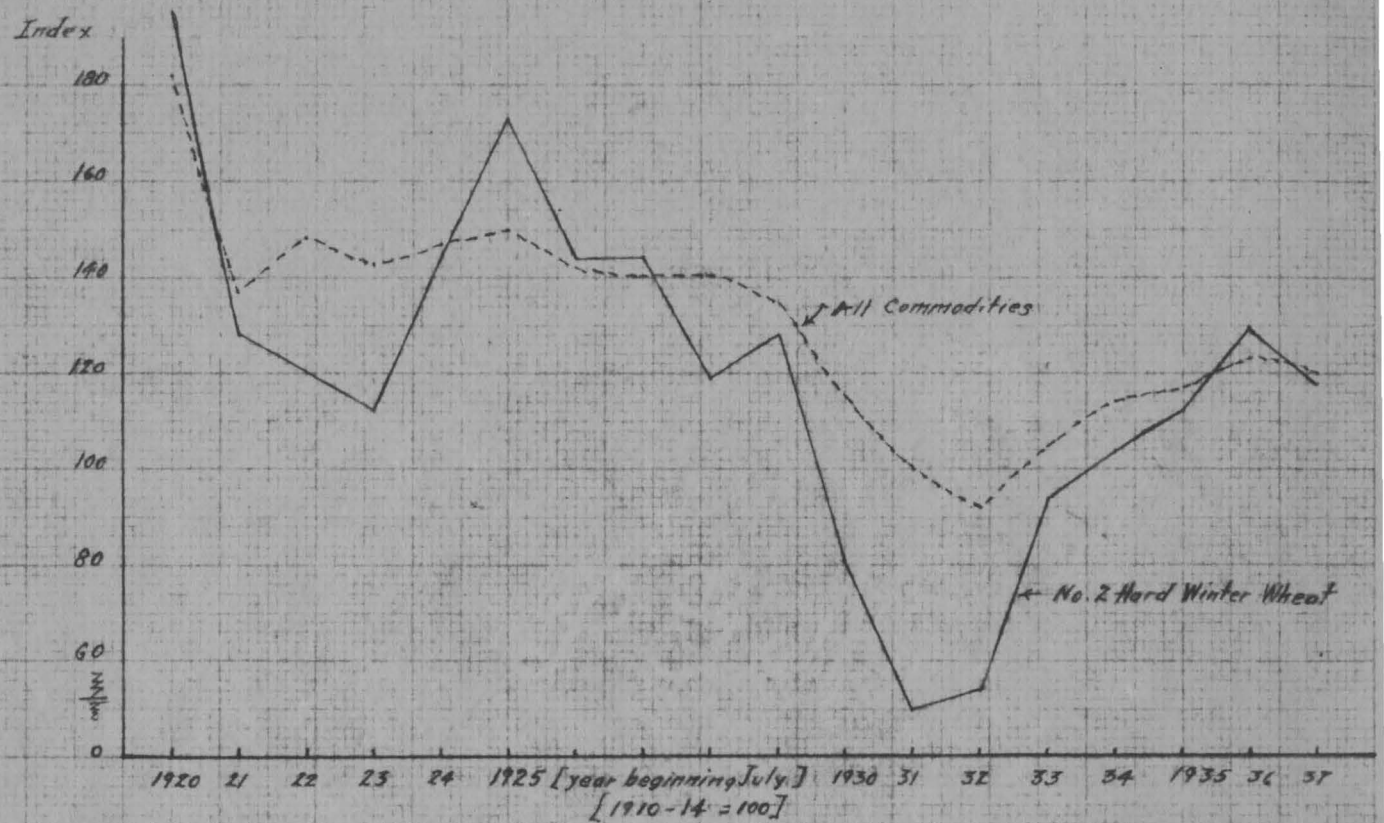

Fig. 7.-Index Numbers of the Price of All Commodities and No. 2 Hard Winter Wheat at Kansas City, 1920-1937

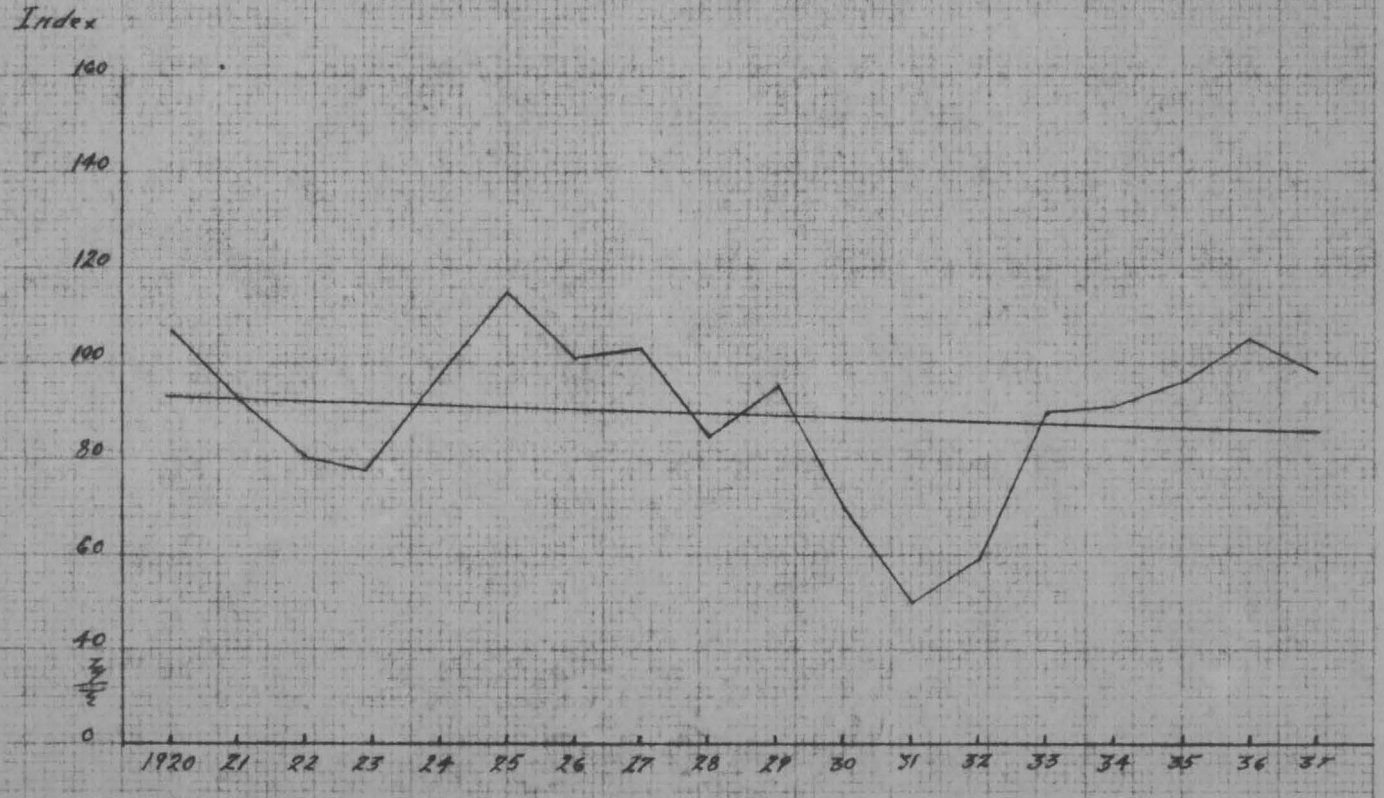

Fig. 8.-Purchasing Power of No. 2 Hard Winter Wheat at Kansas City, 1920-1937
$y = 93.6 + (-.46)x$, Origin at 1920

large supplies depressed wheat prices far below the prices of all commodities. If supply and demand influences could be disregarded, it is probable that the price of wheat would tend to fall faster than prices of all commodities due to the relative flexibility of wheat prices. The affects of supply and demand no doubt accentuated the fall which would otherwise have occurred.

Figure 8 shows the purchasing power of No. 2 Hard Winter wheat and its trend. 1/ Since 1920 the trend of purchasing power has been slightly downward at the rate of less than 0.5 percent of the first year. 2/ The influence of supply and demand may be more easily seen in this illustration, where an attempt has been made to "eliminate" the affect of changes in the value of money.

Gross correlations were calculated in an effort to determine the association between fluctuations in the crop year price of wheat and index numbers of the prices of all commodities for the same year. 3/ The period covered contained 17 years, 1921 to 1937. The method of first differences was used in calculating the measurements. The coefficient of gross correlation between the price of No. 1 Northern Spring wheat at Minneapolis and the index numbers of the price of all commodities was + 0.77, while that between prices of No. 2 Hard Winter wheat at Kansas City and all commodities was + 0.83. When perfect correlation

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1/ Index numbers of the prices of all commodities were used in determining purchasing power. See Table

2/ Y = 93.6 + (-.46) X, (purchasing power), origin at 1920.

3/ Table 22 for correlation coefficients.

is found the coefficient is equal to 1. When the relationship between variables is direct the coefficient bears a plus sign, while if the association is inverse the coefficient has a minus sign. No correction was made in the above coefficients for the small number of observations.

DEVALUATION AND THE PRICE OF WHEAT

The Price of Gold

On the money side of the equation giving the relationship of the supply and demand for goods, the supply and demand for money and the price level, there are at least three factors to be considered; the supply of gold, the demand for gold, and the price of gold.

The price of gold gives the relationship between gold and the monetary unit. Prior to 1933 the price of gold in the United States was $20.67 per ounce or the dollar was equivalent to 23.22 grains of fine gold. After devaluation the relationship between the monetary unit and gold had been changed. February 1st, 1934 the price of gold was set at $35 per ounce.

A government has control over the price of gold but not over its value. Index numbers prepared at Cornell University have shown that the internal price structure of a country, whose currency is definitely tied to gold at a constant relationship, tends to move similarly to the world price level in gold. 1/ This shows that the value of gold is determined not by the government of one country, but by supply and demand conditions throughout the world. The value of gold is world-wide and location of supply has little affect on the value in any particular country. If a country devalues its monetary unit by changing its relationship with gold, the internal price structure of that country, as measured by basic commodities, will advance relative to the world price level in gold.

1/ Department of Agricultural Economics, Cornell University, Farm Economics, No. 110.

When a country raises the price of gold, certain commodities respond rapidly. Basic commodities are of this type. As commodities proceed along the channels of processing and distribution, their prices are influenced less and less by lowering the gold value of the monetary unit.

When devaluation occurs, the affect of raising the price of gold on the internal price level of the country depends upon; the rate and amount of increase in the price of gold, upon the relation of the internal price level and the world price level prior to devaluation, and upon the change in the world price level after devaluation has taken place.

If the internal price level is in close relation with the world level, the following likely combinations of the two factors, the price of gold and the world price level, causing varying changes in the internal price structure of a country are quoted from an article by Doctors F. A. Pearson and W. I. Myers in Farm Economics No. 110, periodical published by the Department of Agricultural Economics at Cornell University.

(1) "If a country raises its price of gold at a time when the world prices of basic commodities are falling at a rapid rate, prices of basic commodities in that country will fall, but at a less rapid rate than the world".

(2) "If a country raises its price of gold slowly at a time when the world price level is falling slowly, prices in that country will change little".

(3) "If a country raises its price of gold slowly at a time when the world price level is stable, prices in that country will rise about as much as the price of gold was raised".

(4) "If a country raises its price of gold slowly at a time when the world price level is rising slowly, prices in that country will rise more than the price of gold was raised".

(5) "If a country raises its price of gold slowly at a time when world prices are rising rapidly, prices in that country will rise much more rapidly than the price of gold".

(6) "If a country raises its price of gold at a rapid rate at a time when the world prices of basic commodities are falling at a rapid rate, prices of basic commodities in that country will not rise so much as the price of gold".

(7) "If a country raises its price of gold rapidly at a time when the world prices are falling slowly, prices in that country will rise, but at a less rapid rate than the price of gold".

(8) "If a country raises its price of gold rapidly at a time when the world price level is stable, prices in that country will rise rapidly at about the same rate as the price of gold was changed".

(9) "If a country raises its price of gold rapidly at a time when the world price level is rising slowly, prices in that country will rise more rapidly than the price of gold was changed".

(10) "If a country raises its price of gold at a time when the world prices are rising rapidly, the prices of basic commodities in that country will rise much more than the price of gold was raised".

"When the price of gold remains constant, the price level of any country tends to follow closely the changes in the world price level".

Devaluation means reducing the quantity of gold which will exchange for the monetary unit. This may be accomplished by raising the price of gold which results in increasing the number of monetary units necessary to exchange for a given quantity of gold.

A country raises the price of gold in an attempt to increase low commodity prices or to stabilize prices in currency when the world value of gold increases. Practically all important countries have changed the relation between their monetary unit and gold. In December, 1929 Australia and Argentina officially suspended the gold standard. By October, 1934, 44 countries had left the gold standard. Several other countries at that time were maintaining a gold standard but not at the pre-war level. Since then the Netherlands and France have made changes in their monetary systems.

A gold standard has been said "to exist in any country in which prices of goods and the obligations of debtors are usually expressed in terms of the value of a monetary unit consisting of a fixed quantity of gold in a free gold market. The gold standard exists whenever the value of gold in a free gold market is the actual standard, regardless of the machinery by which the standard is maintained and regardless of whether this machinery operates automatically or is managed. The gold standard does not require coin to be in circulation or even to be coined. 1/

1/ Kemmerer, E. W., "Currency Stabilization in Latin America, Fourth Pan American Commercial Conference", page 2, October 6, 1931.

Some writers maintain that the post-war gold standard of certain countries was not the same as the pre-war standard, although the same relation between gold and the monetary unit was found. Sir Charles Morgan-Webb in his book "The Rise and Fall of the Gold Standard", differentiates between the post-war and pre-war gold standards and distinguishes between the "dollar standard" and the "sterling standard". In distinguishing between the latter two, he places special emphasis on the results to be attained by use of the standard.

Figure 9 shows the index numbers of the price of gold in the five countires; Australia, Canada, the United States, England and Argentina since 1928. The pre-war relation between gold and the monetary unit of each is taken to be 100.

Australia left the gold standard in December, 1929 but maintained the Australian pound at almost par with the English unit. Prior to 1929, there was a premium for gold in terms of the Australian pound during the period of the World War and up to 1925, when the pre-war relationship was restored. After leaving the gold standard in 1929 the premium for gold in terms of the Australian pound, ranged from 1.3 percent in January, 1929 to 9.2 percent in December, 1930. In January, 1931 the value of the Australian pound was reduced and in February of that year it was tied to the English pound at the rate of 130 to 100. The index number of the price of gold in that month stood at 130.8. When in September, 1931 England suspended the gold standard the English pound fell in value in terms of gold and by December the price of gold had advanced 42 percent. (Table 3). Since

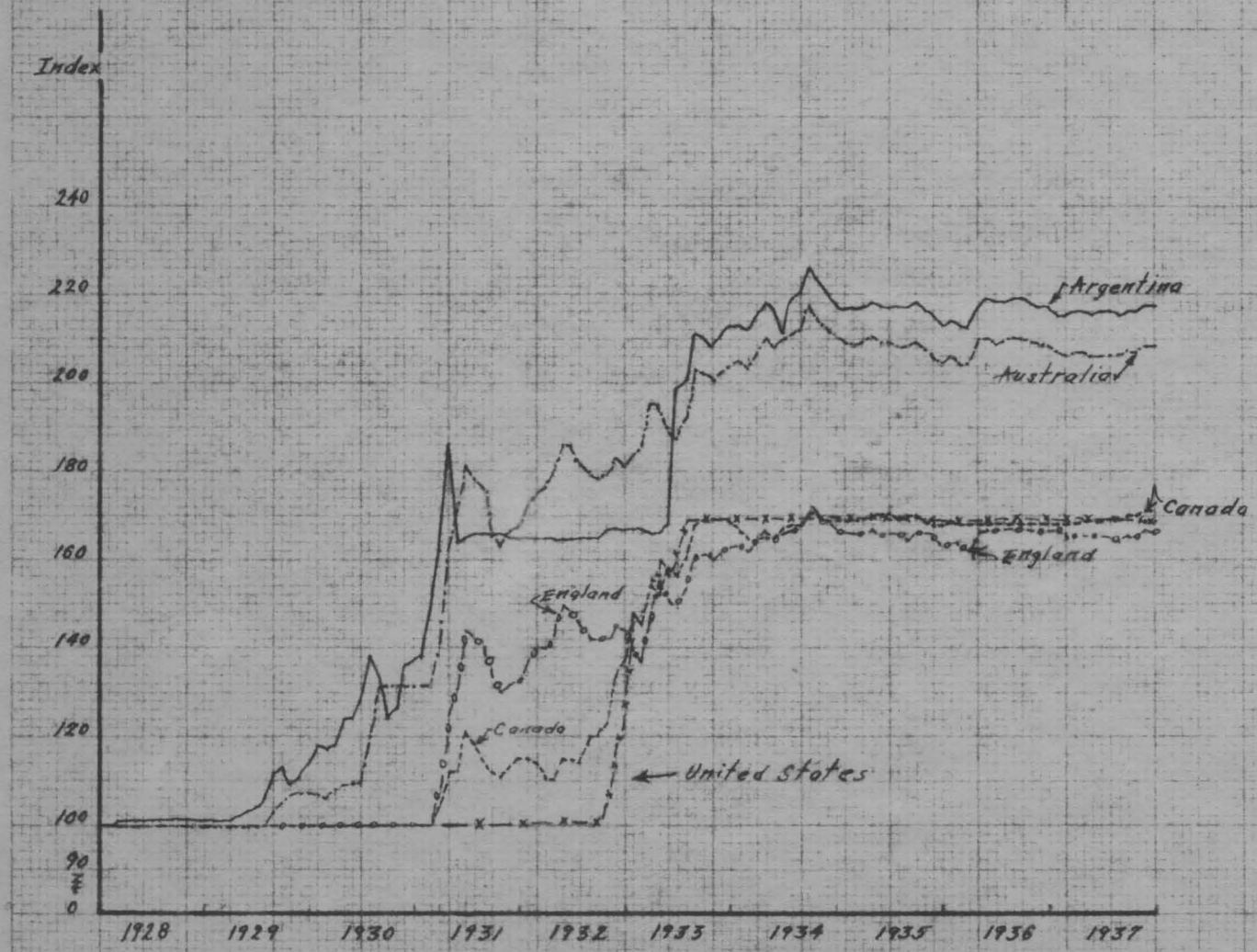

Fig. 9 - Index Numbers of the Price of Gold in Specified Countries

Pre-War Par = 100

the Australian pound was tied to the English unit at 130 to 100, the Australian pound also fell in terms of gold, until in December gold commanded a premium of 81 percent. In that month the relation between the Australian and English pound was changed to 125 to 100. Beginning in 1931 the price of gold in Australia rose, until in March, 1935, the index number stood at 216.6. Since that time the Australian pound has been relatively stable at an index of price of between 204 and 210. (Figure 9) (Table 1).

At par the Australian pound was equivalent to the English pound and contained 113.002 grains of fine gold. It was equal to 4.86656 dollars in terms of United States gold currency.

Prior to December 16, 1929 when Argentina officially suspended the gold standard and since July 1920, gold commanded a premium in terms of the Argentine peso as much as 47 percent in July, 1921. From January, 1925 to January, 1929 the peso fluctuated slightly above and below the pre-war par. In March, 1926 the index of the price of gold in terms of the peso was 107, while in December, 1927 the index number stood at 99. Upon leaving the gold standard in December, 1929 the price of gold in terms of the peso followed a course similar to that in terms of the Australian pound until in October, 1931, when the price in terms of the peso fell from an index of 186 to 164 in November. From 1931 to November, 1933 the price of gold in Argentina remained practically stable. In December, 1933 gold commanded a premium of 99 percent. Between December, 1933 and March, 1935 the value of the peso in terms

of gold again declined, until in the latter month the index of the price of gold registered 226. Since that time the gold value of the peso has remained comparatively stable at a slightly lower level. Since 1933 the price of gold in terms of the peso has been slightly higher than in terms of the Australian pound (Table 2).

At par the Argentine peso is equivalent to 22.40186 grains of fine gold and in terms of the gold dollar was worth 96.476 cents. The Argentine paper peso is equivalent to 44 percent of the gold peso.

In England the gold standard was not legally abandoned but a gradual break took place, and in terms of the English pound gold began to command a premium in September, 1931. England had maintained her gold currency since May, 1925. She abandoned the gold standard during the World War period and returned to the pre-war relationship between the pound and gold in 1925. Between July, 1920 and May, 1925, gold commanded a premium in terms of the pound ranging from 41 to one percent. (Table 3) The pre-war legal price of gold was 77 shillings, 10½ pence per ounce. When the price of gold began to increase in September, 1931 the old relationship had been broken. From September to December, 1931 the price of gold had risen 42 percent. By April, 1932 it had fallen again to 31 percent, but again increased until in October, 1934 gold commanded a premium of 67 percent over its old relationship to the pound. Since October, 1934 the pound price of gold has remained comparatively stable, fluctuating between an index of 163 and 173. (Figure 9)

The pre-war Canadian dollar was equivalent to the United States gold dollar, both containing 23.22 grains of fine gold. Between July, 1920 and July, 1926 Canada was off the gold standard, having abandoned it during the month of August, 1914. During the period 1920 to 1926 gold commanded a premium as high as 14 percent in terms of the Canadian dollar. In 1926 Canada returned to the gold standard only to leave it again in October, 1931. (Table 4) Beginning in September, 1931 the Canadian dollar fell in value in terms of gold until in December of that year the index of the price of gold stood at 121. The dollar price of gold fell to an index of 115 in February, 1932, fluctuating around this level until February, 1933, when an increase began. In February, 1934 gold commanded a premium of 71 percent. Since this time the price has fluctuated within a relatively narrow range. (Figure 9) Between September, 1931 and July, 1932 the English pound sterling price of gold was considerably above the Canadian dollar price, but since that time the two have been comparatively stable at about the same level.

The United States maintained the gold standard longer than any of the above mentioned countries. Although the gold standard was officially suspended on March 6, 1933, the dollar was kept at par in foreign exchanges until April 19, 1933. No attempt was made after suspension to control the price of gold and as a result, the price rose and fluctuated. In October of 1933, the Reconstruction Finance Corporation was authorized to purchase newly mined gold at a price which was to be determined from

"time to time". The dollar price of gold rose 60 percent by November, 1933, falling again in December to 56 percent. On February 1, 1934, an executive order was issued setting the weight of gold in the dollar at 15 5/21 grains nine-tenths fine, or an equivalent price of $35 per ounce of fine gold. The price has remained at that figure since. When the price of gold prior to devaluation is taken as 100, the index number of price at the present is 169.3. (Table 5) When devaluation had taken place and the price of gold set at $35 per fine ounce, the dollar contained 13.7143 grains of fine gold.

As may be seen from Figure 9, since January, 1934 the price of gold in five countries has been comparatively stable. The price in Australia and Argentina has been considerably higher than in Canada, the United States, and England. The latter countries raised the price to about the same level, while the former have maintained a similar spread through most of the period since February, 1934.

Index Numbers of the Price of Wheat in Five Countries

In an attempt to determine the affect of devaluation policies in several countries on the price of wheat, it was necessary to place the prices so used on a comparable basis. Prices in some countries are quoted in shillings, in others in dollars, and in others in pesos. To place these various units on a basis which was usable, index numbers were employed.

For this portion of the study, index numbers of the price of wheat in five different countries were prepared by months for the

crop year, July-June, for the period 1920 to 1937. The prices used were those in the original units of currency of the respective countries and were furnished through the courtesy of Doctor O. C. Stine, Chief of the Division of Statistical and Historical Research, Bureau of Agricultural Economics of the United States Department of Agriculture.

The prices quoted at terminal markets in each country were taken to be representative of that country. Such prices react more rapidly to factors responsible for changes in price and it was thought advisable for this reason to use such a series. In some countries this type of price series is probably the only one available.

The index numbers were calculated for the following countries: the United States, Canada, England, Argentina and Australia. All of these countries, with the exception of England, produce important surpluses of wheat. England is by far the largest importer of wheat and draws her supply largely from these exporting areas.

The terminal markets of the five countries and grades represented by the prices are: Kansas City, No. 2 Hard Winter in the United States; Buenos Aires, No. 2 Semi-Hard in Argentina; Winnipeg, No. 3 Manitoba Northern in Canada; Sidney, Milling in Australia; and Liverpool, Imported Parcels in England. Although the grades and types of wheat for all countries are far from comparable, it is the writer's opinion that they are representative enough for the present use.

The original prices quoted in the currencies of the various countries are found in Tables 6, 7, 8, 9 and 10. An explanation concerning

each series is found in the footnotes at the end of the tables. In an instance or two, adjustments were necessary to obtain comparable prices for the 1910-1914 base period, and in each case special notation is given.

To obtain index numbers of the price of wheat in currency in a particular country the following procedure was used. The monthly averages for the base period, January, 1910 to December, 1914, were calculated by adding the five Januarys for 1910 to 1914 and dividing by five, the five Februarys and dividing by five, and so on until all 12 averages were obtained. The average for each month was taken as the base (100) and divided into the corresponding monthly price for each year during the period 1920 to 1937. The resulting index numbers for a particular country were called "index numbers of the price of wheat in currency". The index numbers, as calculated for the five countries, are given in Tables 11, 12, 13, 14 and 15.

Due to the fact that the index numbers of the price of wheat for the five countries thus far calculated are in currency, and that during the period 1920 to 1937 all the countries had changed the relation between their monetary unit and gold, the currency index numbers are not comparable among countries. To place them on a comparable basis, the index numbers calculated in currency were placed on a gold base. The resulting indexes are called "the price of wheat in gold".

To perform this operation the monthly price of wheat in currency for each country was divided by the monthly average price of gold. 1/

1/ See Tables 1, 2, 3, 4 and 5 for index of the price of gold in the five countries.

The index numbers of the price of wheat in gold in the five countries are found in Tables 15, 16, 17, 18 and 19.

The prices of wheat in the five countries in terms of gold corresponded very closely over the entire period 1923 to 1937. (Figure 10) Although local supply and demand conditions influence price in a particular country, one may note the fact that wheat is a world commodity and conditions influencing prices in one country tend to be reflected in prices in other countries. In certain years the price in one country may be out of line with that in others, but as soon as the influence of local conditions diminishes the price again fluctuates with that in other countries. If yearly prices had been used in plotting Figure 10, the prices in the various countries would no doubt correspond still more closely.

In the fall of 1924 Canadian production of wheat was abnormally low as compared to preceding succeeding years. The price in that country advanced over the prices in other countries. In 1929 a similar price situation occurred and in that year Canadian production was also very low. A short crop in the United States in 1925 resulted in pushing Kansas City prices above the level in other countries. The same thing occurred in Argentina. A large crop in Argentina in 1929 reduced the price in that country below the level in the others. In the spring of 1926 Australia harvested a crop of about 85 percent as large as those in the preceding five years, and the price at Sidney in that year was above the prices in other countries. In the crop years 1933, 1934 and 1935, the United States production of wheat was below average. In 1932 the

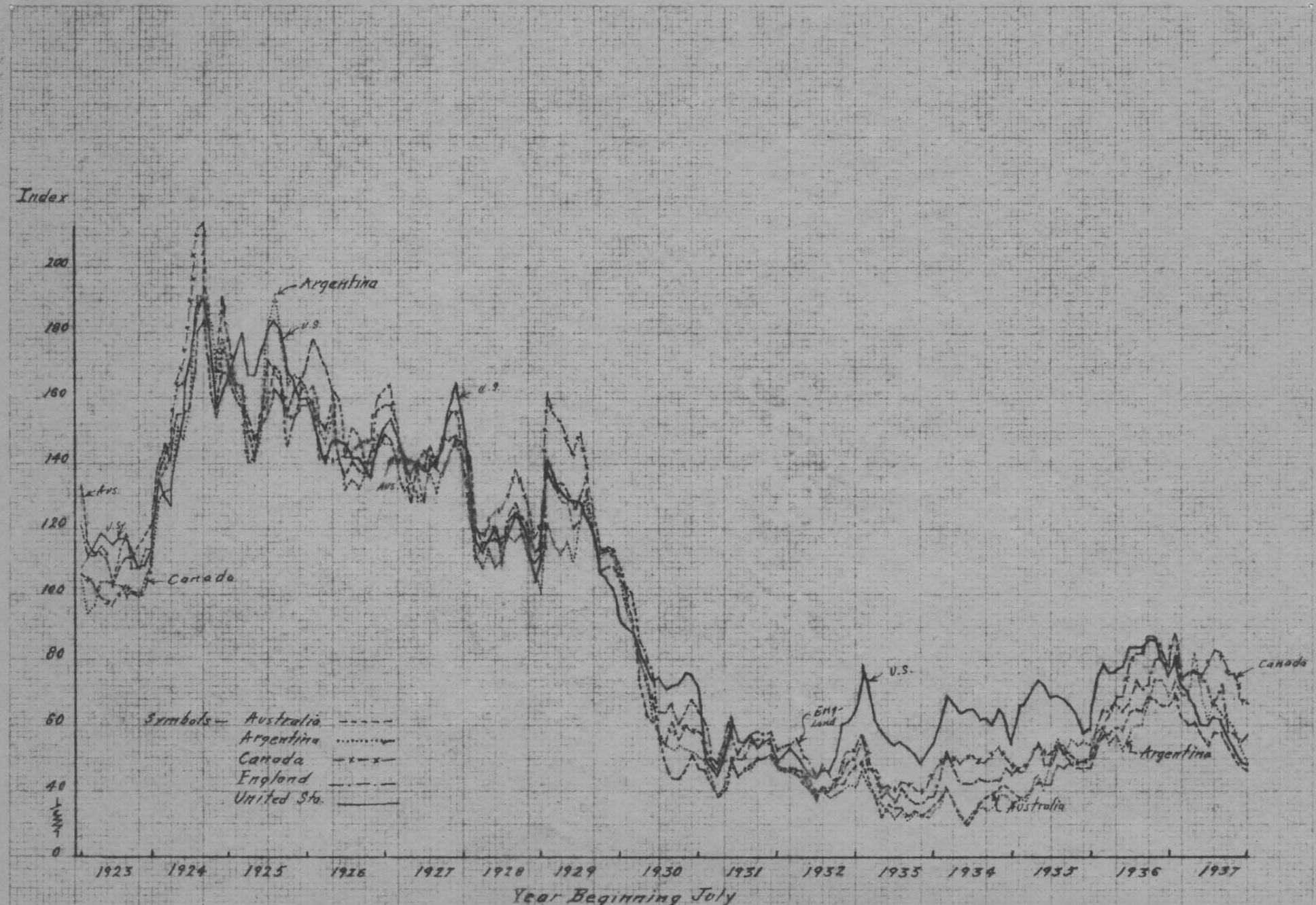

Fig. 10 Index Numbers of the Price of Wheat in United States, Australia, Argentina, England and Canada, in Gold, by Months, 1923-37

crop was 85 percent of that in the preceding five years; in 1933, 64 percent; in 1934, 66 percent and in 1935, 85 percent. These short crops plus tariff restrictions, excluding imports, raised terminal market prices in this country above the world level. A short Canadian crop in 1937 probably contributed considerably to the failure of Winnipeg prices to fall as fast as those in other countries in the latter portion of the crop year 1937-1938.

To show the affect of devaluation on the price of wheat in the various countries, the writer is of the opinion that it is necessary to compare prices in currency in one country with those in gold in the others.

In comparing prices of many commodities in one country with those in another, there is usually no need to consider the affect of local supply on price. If the supply of one commodity is large it is probable that another may be short and when many commodities are used there is a tendency for compensating results. There is a tendency for abundant supplies of one commodity to be offset by scarcity in another.

When a comparison is made between the price of wheat in the United States and Argentina for instance, one encounters the affect of local supply and demand conditions. As was pointed out in connection with Figure 10, these local influences often cause considerable differences in price between countries.

In attempting to eliminate some of these influences in a comparison between the price of wheat in a particular country and

that in other countries, it seemed advisable to combine the prices in all five countries and use it as a basis for comparing prices in currency in a particular country. By combining prices in gold in the five countries, there is a tendency for local supply and demand conditions to average out and result in a price which would be more representative.

Several attempts were made at securing proper weights to be assigned each country in weighting the price index for wheat in five countries. A limited amount of time caused the writer to discard this idea and use simple averages of the index numbers of price in the five countries.

Even though no weights were used in deriving the price index for five countries, the resulting simple averages are considered to be reliable enough for their present use. A study of Figure 10 will show that the gold prices of wheat in the various countries correspond rather closely and the deviations from the average would probably not be large. The simple averages of the monthly index numbers of the price of wheat in five countries are given in Table 20.

A comparison was made between these simple averages of the index numbers of the price of wheat in gold in five countries and the world price level of 40 basic commodities in gold. (The reciprocal of the latter is considered at present to be the best measure of the value of gold) (Table 21). As may be seen in Figure 11, the two follow quite closely in their broad movements. Fluctuations in the average price of wheat away from the general trend of the world price level are due principally to conditions of supply and demand affecting that

commodity. During the crop year 1923-1924, the deviations of the price of wheat from the world price level of basic commodities can probably best be attributed to the increased world production of that year and decreased buying by importing nations. In 1928 an increase in world production to a level of 3,996 million bushels (a record crop at that time) probably caused the price fall in that year. (Figure 11) Beginning in 1929 world stocks accumulated and with a high level of production during the early 1930's resulted in record breaking world supplies for the period 1929-1930 to 1933-1934. Short crops in several of the important wheat producing countries during 1933, 1934 and 1935 gradually reduced world supplies until in 1936 and 1937 they were reduced considerably.

During the period 1929 to 1935, the average price of wheat in five countries was considerably below the world price of basic commodities,due mostly to large supplies of wheat. If average supplies had prevailed during this period, the price of wheat could have been expected to fall slightly faster than the world price level, due to the tendency for a basic commodity such as wheat to react more rapidly to changes in the general price level.

Devaluation and the Price of Wheat in the United States

The United States abandoned the gold standard in March, 1933, but maintained the dollar at par in foreign exchange until April 19, 1933. After April 19th the price of gold began to rise and fluctuated until it was stabilized at $35 per fine ounce on February 1, 1934.

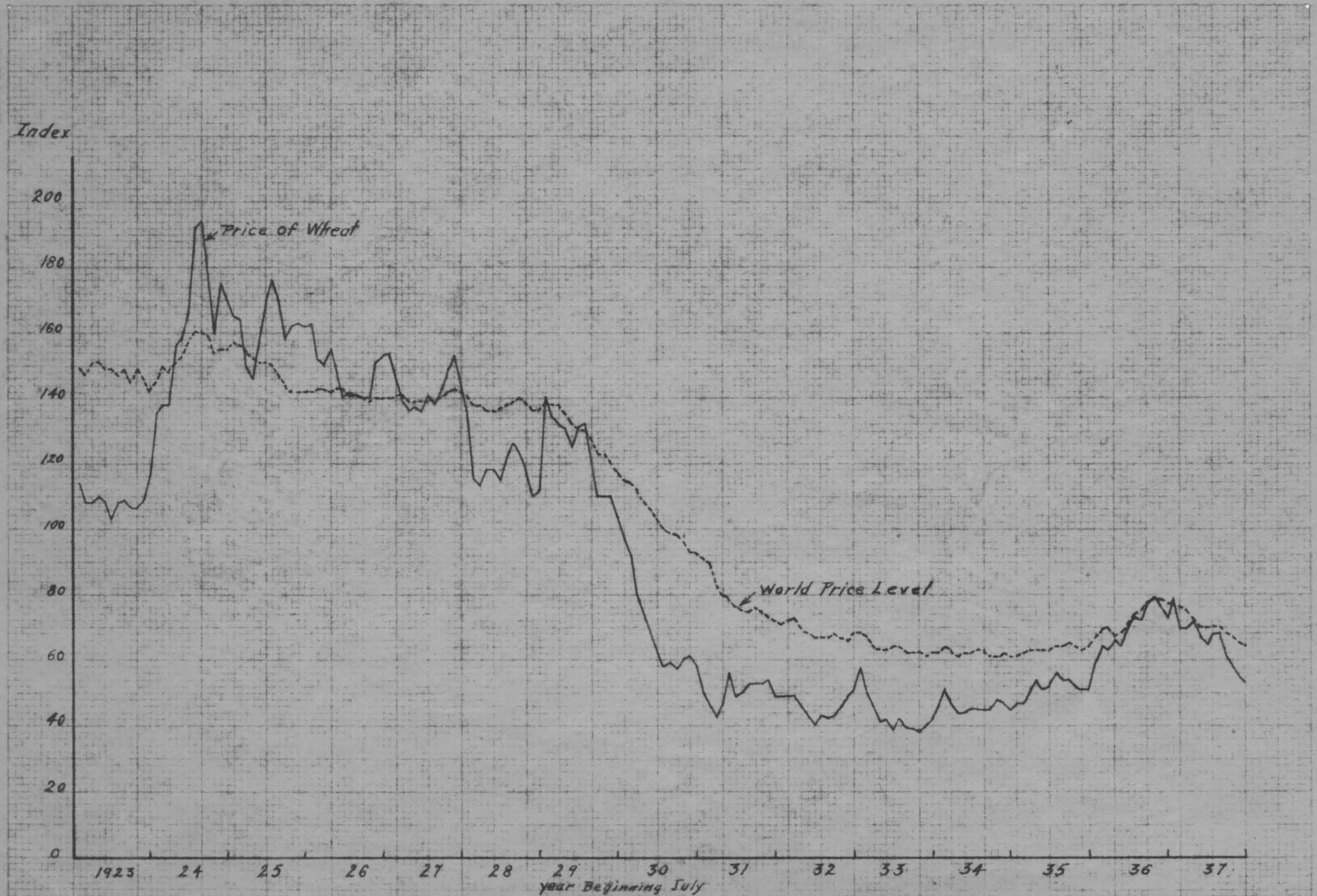

Fig.11.-Index Numbers of World Price Level of 40 Basic Commodities in 10 Countries and the Average of the Index Numbers of the Price of Wheat in Five Countries, in Gold, 1923-1937.
[1910-14 = 100]

In Figure 12 is shown the index numbers of the price of gold in the United States, the currency price of No. 2 Hard Winter wheat at Kansas City and the average of the index numbers of the price of wheat in five countries in gold.

The United States dollar had a constant relationship with gold (index of 100 or par) through the period 1923 to April 19, 1933. The price of wheat in currency was therefore the same as the price in gold. During this time the price at Kansas City followed the course of the average price in five countries.

A short crop, 81 percent of the preceding five years, in 1925 tended to make prices at Kansas City higher than in five countries. The spread between prices at Kansas City and in five countries in the latter portion of the 1930 crop year may possibly be attributed to the activities of the Grain Stabilization Corporation and subsidiaries of the Federal Farm Board as established under the Agricultural Marketing Act of 1929. Efforts were made to peg the price in the fall of 1930 by the purchase of grain futures and a decline was temporarily averted by pegging the price of old-crop wheat futures.

The period 1923 to the latter portion of 1932 was characterised by few abnormal influences of local supply and demand.

Beginning in March of the crop year 1932-1933 and continuing until the latter portion of 1936, prices at Kansas City in gold were above the level in other countries. This was due primarily to tariff restrictions and four abnormally short crops in this country. (Figure 10) In 1932 the crop was 85 percent of the preceding five years; in 1933,

64 percent; in 1934, 66 percent and in 1935, 85 percent. The crop in 1936 was slightly larger than that in 1935.

The price of gold in terms of the United States dollar began to rise in April, 1933, and continued after several fluctuations until February 1, 1934, when it was stabilized at 69.3 percent above the old par of $20.67 per fine ounce. Basic commodities rose rapidly, but not as fast or by as great an amount as the price of gold, because the world price level was falling slowly. 1/

If all influences of supply and demand could be eliminated, the price of wheat at Kansas City could not be expected to increase at the same rate or by the same amount as the increase in the price of gold due to the fall in the world price level. It could be expected to increase above the average price in five countries at a slower rate and by a smaller amount than the increase in the price of gold.

The increase in the price of wheat in the United States relative to that in five countries due to the increase in the price of gold, came at a time when local supply conditions, as well as world supply conditions, were tending to push prices up. Wheat prices in five countries in the latter portion of the 1932 crop year increased, but prices increased much more in the United States. (Figure 12).

When the price of gold began to rise, prices of wheat in the United States increased rapidly. Short wheat crops in the United States and world factors affecting prices raised wheat prices higher than could reasonably have been expected from revaluation of the currency.

1/ See Farm Economics110, op. cit.

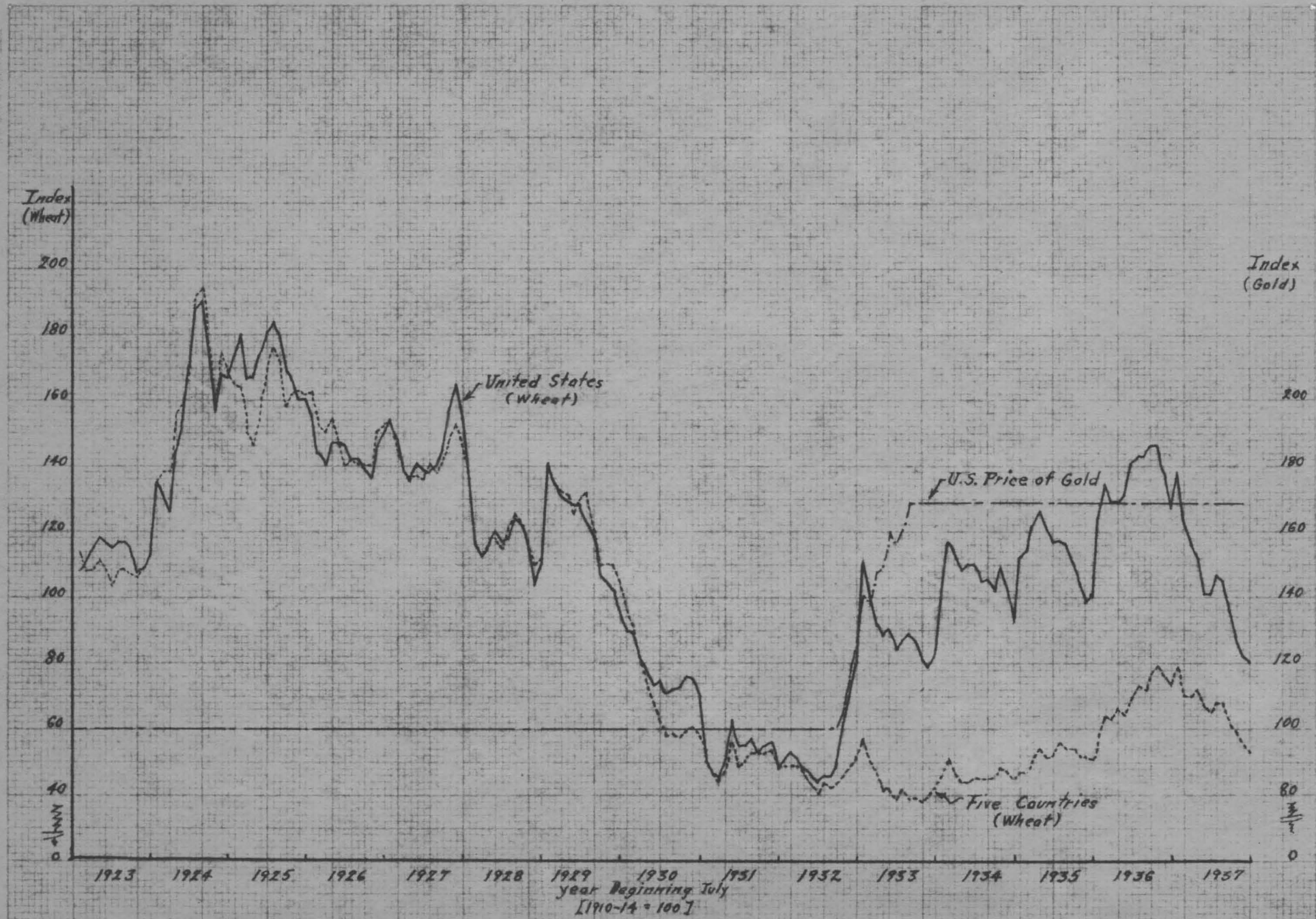

Fig. 11—Index Numbers of the Price of Wheat in the United States in Currency and the Average Price in Five Countries in Gold, and the Price of Gold in the United States, 1923-1937

After February, 1934, when the price of gold was stabilised, the price of wheat in this country continued to fluctuate violently at a level considerably above that in five countries. Local supply and demand factors continued to play a very important part in domestic wheat prices. It may be seen in Figure 12 that prices at the beginning of each crop year, July to June, from 1934 to 1936 rose rapidly, declining again during the crop year until a new crop was harvested, resulting in another increase. Although during this period a slow advance occurred in the price of wheat in five countries, the violent advances at the beginning of each crop year in the United States may be attributed to the harvesting of extremely short crops. During some of these years we imported certain classes of wheat for seed and flour. The tariff probably excluded large amounts of foreign wheat which might have lowered prices.

The increases in United States wheat prices, as well as those in five countries during 1936, may be attributed in a large measure to the increase in the world price level. (See Figure 11) The decrease in prices after 1936 in five countries was no doubt due principally to a fall in the world price level. The decrease in prices in the United States was supplemented by an increased crop, pushing prices in this country down faster than in the five countries.

Since the United States abandoned the gold standard and up until 1937, local supply and demand conditions have influenced wheat prices in this country to such a large extent that it is difficult to show the affect of increasing the price of gold.

Devaluation and the Price of Wheat in Australia

Australia, after abandoning the gold standard during the World War, restored the pre-war relation between the pound and gold in May, 1925. As may be seen in Figure 13, the price of wheat at Sidney fluctuated slightly above the level in five countries from 1923 into a portion of the 1924 crop year.

During the period when the Australian pound was at par with gold, May, 1925 to December, 1929, the price of wheat at Sidney followed a course similar to that in five countries at approximately the same level.

Beginning in June, 1926 the price of wheat in Australia increased above the level in five countries. This is probably accounted for by the fact that the crop harvested in the preceding December and January was but 85 percent of that in the preceding five years. In November, 1926, the price at Sidney was again at the level in five countries.

At the time Australia left the gold standard in December, 1929, basic commodity prices were approximately 20 percent above the world level. In December, 1929 the world price level of 40 basic commodities stood at 131. (Table 21) By February, 1931 the price of gold in Australian pounds had increased to an index of 131 (par = 100). In the meantime the world price level had declined to an index of 99 or about 24 percent. Basic commodity prices in Australia continued to decline with the world price level because the Australian price level was high relative to the world in 1929 and the world price level had fallen considerably. 1/

1/ Farm Economics No. 110, op. cit.

The price of wheat in Australia continued to follow the downward course of the level in five countries, which had begun in the early part of the crop year 1929, until May, 1931. At this time the price at Sidney increased slightly relative to the level in five countries. This slight increase could have been due to local supply and demand conditions or to some readjustment in the relation of the internal price structure in Australia to the world level.

In September, 1931 the price of gold again increased. This time from an index of 131 in August of that year to 181 in December, an increase of about 38 percent. During the same time the world price level fell from an index of 84 in September to 76 in December or almost 10 percent. The price of gold had increased about 38 percent while the world price level fell 10 percent; the price of wheat rose considerably above the level in five countries. (Figure 13)

From December 1931 to March 1935, the price of gold continued to rise slowly until in the latter month its price stood at an index of 217. (Table 1) This amounted to an increase of about 20 percent. In the meantime, the world price level fell from an index of 76 in December of 1931 to 61 in March 1935, or a decline of about 20 percent. The price of wheat in Australia fluctuated with that in five countries but at a considerably higher level. There was no substantial increase or decrease in the spread between the two during this period when the price of gold rose about as much as the world price level fell.

After 1934 the price of gold remained relatively stable. The price of wheat in Australia in 1935 and 1936 increased relative to the level in five countries. Production in Australia in the mid-winter of the

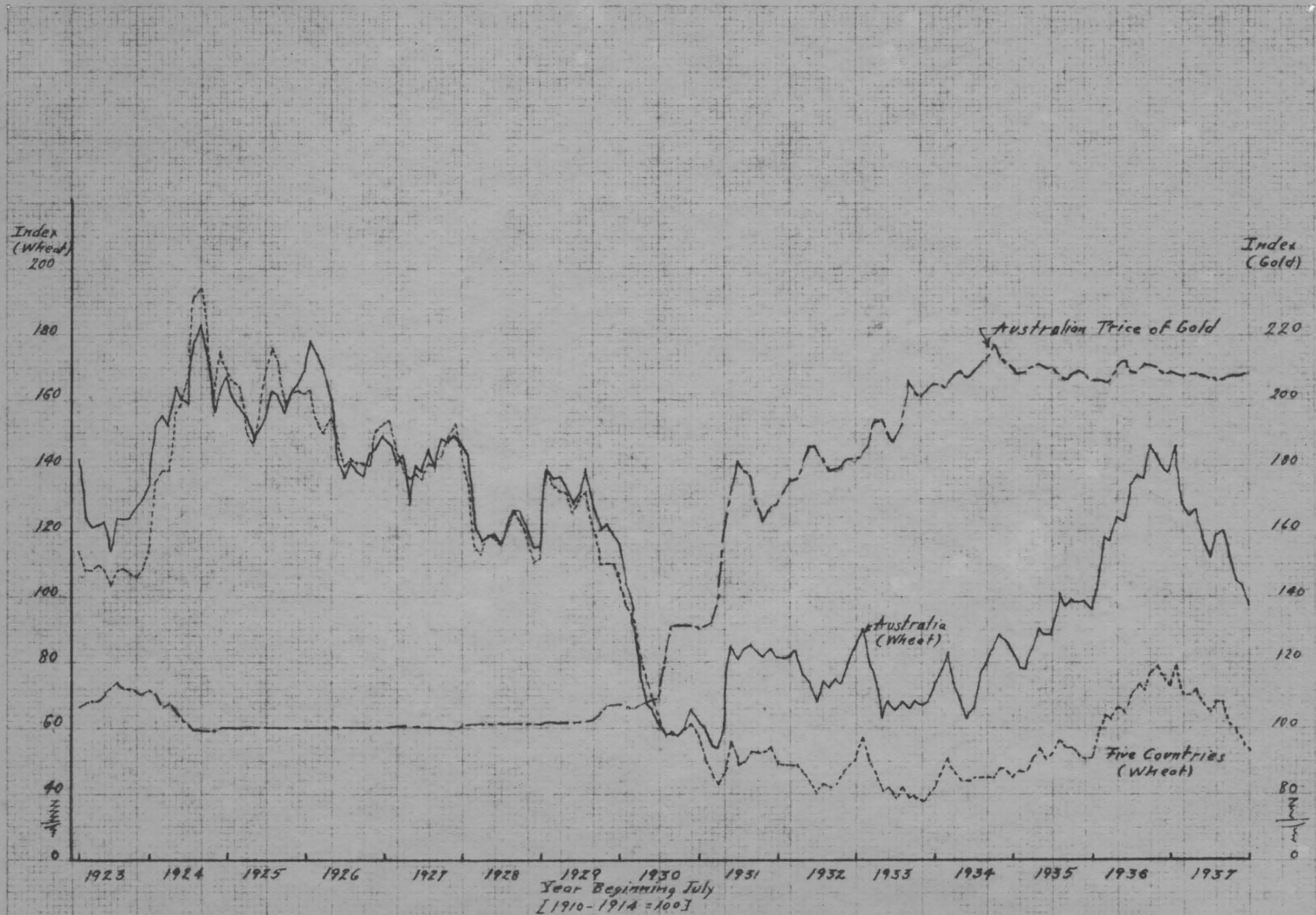

Fig. 13.- Index Numbers of the Price of Wheat in Australia in Currency, the Average Price in Five Countries in Gold, and the Price of Gold in Australia, 1923-1937

1935-1936 crop year was about 76 percent of the average from 1930 to 1934. In early 1936 there was harvested a crop slightly more than in the previous year, while production in the 1936-1937 crop year was above the 1930-1934 five year average. Wheat prices in Australia and other countries in 1936 increased with the rise in the world price level. In Australia prices were above the level in five countries due to a short crop and devaluation, and were probably higher than could be expected from increasing the price of gold.

In 1937 wheat prices declined in all countries with the world price level. (Figure 11) The decline in Australia was greater than the average in five countries, due to a larger than average crop.

Devaluation and the Price of Wheat in Canada

From 1923 to October, 1931 the price of gold in terms of the Canadian dollar was practically at par. The price of wheat at Winnipeg in Canadian currency fluctuated with the level in five countries in gold. (Figure 14) A slight deviation occurred in 1923. In this year Canada produced a record crop. In 1924 Canadian production was low compared to preceding and succeeding years and the price at Winnipeg was slightly above the level in five countries. In 1929 a similar situation occurred.

Canada left the gold standard in the fall of 1931 at a time when the world price level was falling. By December the price of gold had risen to an index of 120 (par = 100). Basic commodity prices in Canada continued to decline with those in the world but at a higher level. 1/

1/ See Farm Economics No. 110, op. cit.

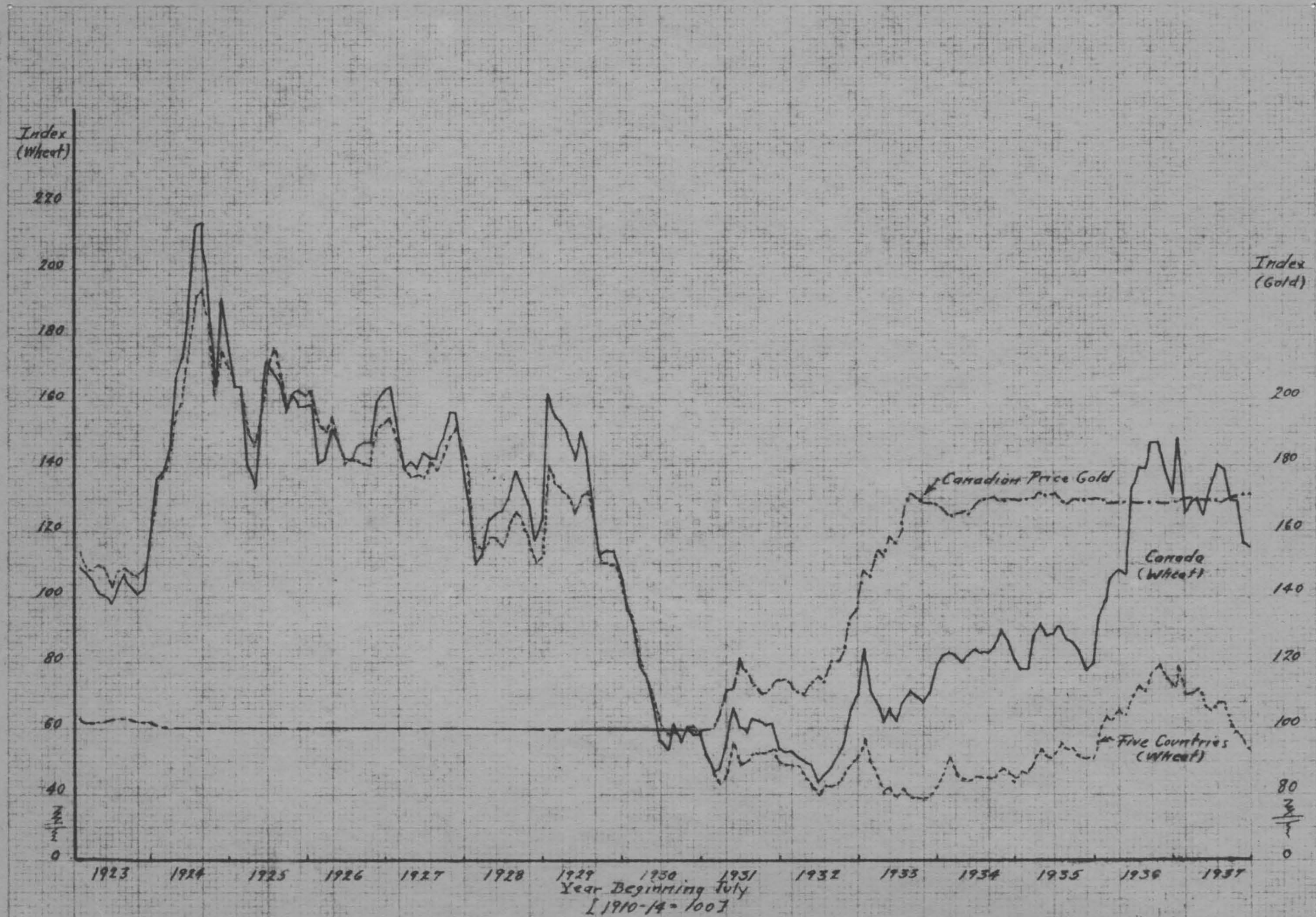

Fig. 14.—Index Numbers of the Price of Wheat in Canada in Currency, the Average Price in Five Countries in Gold, and the Price of Gold in Canada, 1923-37

Although wheat prices at Winnipeg continued to follow the general trend, they were slightly higher between 1931 and 1932 than that in five countries. During this period the price of gold had increased slightly more than the world price level fell. The increase in wheat prices at Winnipeg relative to the level in five countries occurred during the four months after abandoning the gold standard. From December, 1931 to April, 1932 the price of gold in terms of the Canadian dollar fell and the spread between the level of prices at Winnipeg and that in five countries narrowed.

Beginning in the latter part of the 1932 crop year, the price of gold began to rise and continued until about the middle of 1933. Since that time it has remained practically stable.

During this period of increase in the price of gold, the world price level was falling slowly. The price of gold was increased at a faster rate and by a larger amount than the world price level fell. The price of wheat at Winnipeg in the meantime moved upward absolutely and relatively to the level in five countries. (Figure 14). Basic commodity prices also moved upward, not at the same rate or by the same amount as the price of gold because the world price level had fallen during the period, but at a slower rate and amount than the price of gold had been raised. 1/

Beginning in 1934, the price of wheat in five countries in gold gradually increased, the price at Winnipeg in currency following a similar course but at a higher level. In 1936 the price in five

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1/ See Farm Economics No. 110, op. cit.

countries moved upward with the rise in the world price level. (Figure 11) The price at Winnipeg also rose, but faster than in five countries. During this time the price of gold was relatively stable but in that year Canadian production amounted to only 68 percent of the preceding five years. Even in these five years, certain of the crops were below average due to drought and rust.

In most of 1937 the prices at Winnipeg continued to rise relative to the level in five countries and Canadian production was only 60 percent of the five years preceding.

Devaluation and the Price of Wheat in Argentina

During the period 1923 to 1937 gold commanded a premium in terms of the peso most of the time. In 1923 and a part of 1924 gold in terms of the Argentine peso commanded a premium as high as 30 percent. The price of wheat in Argentina in currency during this period was above the level in five countries in gold, even though in 1923 Argentina produced a record crop. (Figure 15).

From 1924 into 1929, the price of gold was practically at par and the price of wheat in Argentine currency fluctuated with the level in gold in five countries. In December and January 1924 and 1925, Argentina harvested two short crops and the price at Buenos Aires was above the level in five countries. In 1929 a large crop in that country reduced Argentine prices below that in five countries.

In December 1929 Argentina abandoned the gold standard and the price of gold rose. Argentina left the gold standard at a time when world commodity prices were falling. During the latter part of 1929

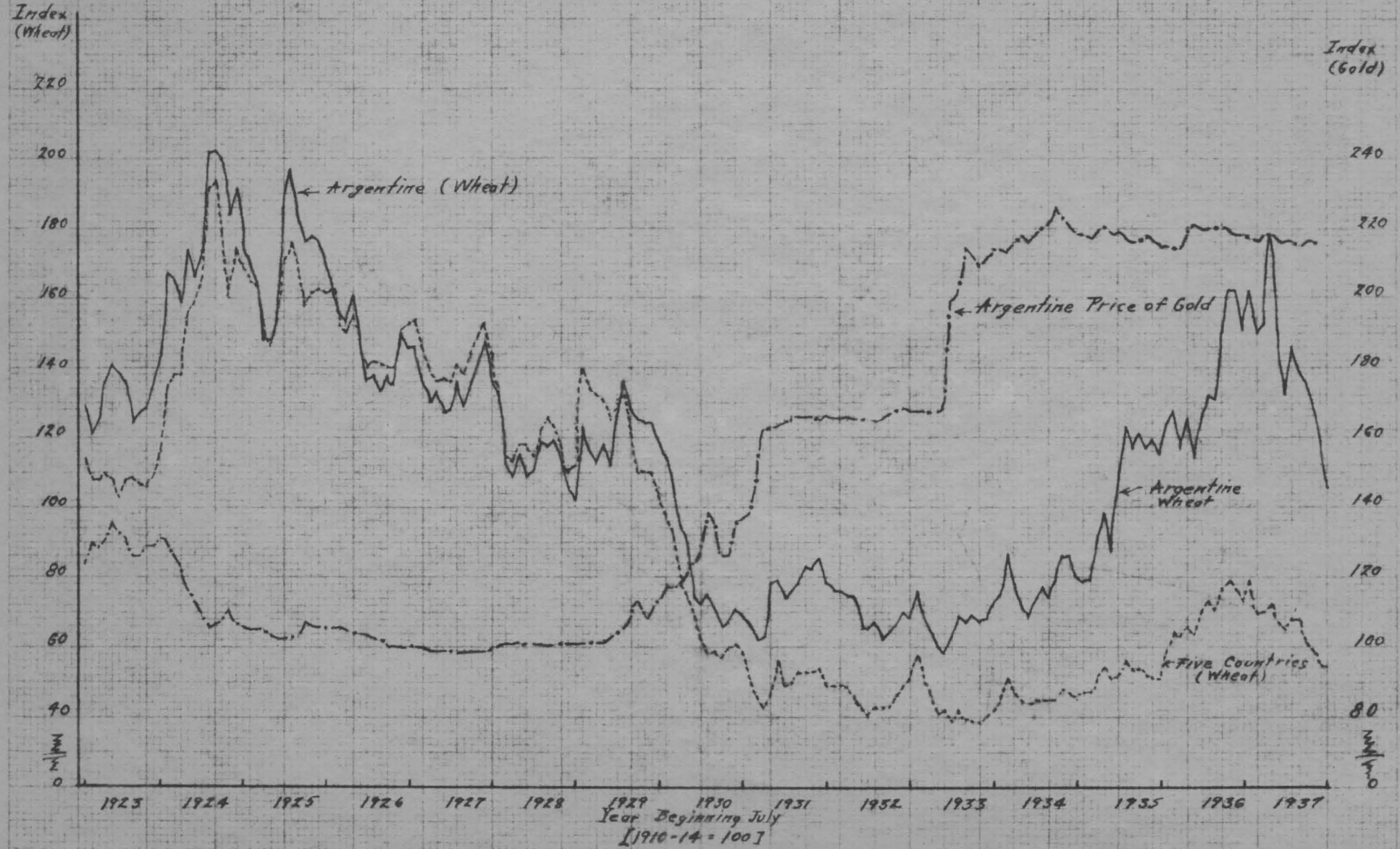

Fig. 15.-Index Numbers of the Price of Wheat in Argentina in Currency, the Average Price in Five Countries in Gold, and the Price of Gold in Argentina, 1923-37

and most of 1930 the world price level fell faster than the price of gold rose and the price of wheat during most of the year followed rather closely the price in five countries. In 1929 Argentina produced a small crop, which probably accounts for the price in Argentina being slightly above that in five countries.

From the latter part of 1930 to October of 1931, the price of gold rose faster and by a greater amount than the world price level fell. The price of wheat in Argentina rose above that in five countires. (Figure 15).

During most of 1931, all of 1932 and a portion of 1933, the price of gold in Argentina was comparatively stable, but the world price level declined. (Figure 11) The spread between the currency price of wheat in Argentina and in five countries in gold,narrowed.

In 1933 the price of gold was again raised, during a time when the world price level was falling slowly. The price of gold was raised faster and by a larger amount than the world price level fell. The price of wheat in Argentina rose relative to the level of prices in five countries in gold. (Figure 15).

After 1934 the price of gold was practically stable at an index varying from 221 in March, 1936 to 214 in September, 1936. The price of wheat continued to increase in Argentina but in December and January of the crop year 1935-1936 Argentina produced a crop of but 141 million bushels, as compared to an average of 244 million bushels in the preceding five years, or 58 percent of the five year average.

After 1936 the price of wheat in Argentina fell faster than in five countries when local supplies had been diminished below average. Stocks of wheat in Argentina on about July 1, 1937 were the lowest since 1922. 1/

Devaluation and the Price of Wheat in England

England abandoned the gold standard in August, 1914 and remained off gold until April, 1925. As shown in Figure 16, from 1923 to November, 1924 gold was at a premium as high as 14 percent in terms of the pound sterling. During this period the price of wheat at Liverpool was slightly above the level in five countries.

England gradually returned to the gold standard and in May, 1925 the price of gold was again stabilized at the old par of 113.0016 grains of pure gold per pound sterling. From May, 1925 to September, 1931 the price of wheat at Liverpool fluctuated with the course in five countries. Because of the fact that England is a large importer of wheat and may draw her supplies from many sources, abnormal influences of local supply conditions are less than in countries producing surpluses. Her domestic crop is small and does not influence prices greatly. Until 1932, wheat entered the Liverpool market duty free. In that year a duty of 6 cents a bushel (at par exchange) was placed upon wheat from other than Empire countries.

England again left the gold standard in September of 1931 and the price of gold began to rise in terms of the pound. From September to

1/ United States Department of Agriculture, Outlook Charts for Wheat and Rye, 1939, p. 18.

Fig. 16. Index Numbers of the Price of Wheat in England in Currency, the Average Price in Five Countries in Gold, and the Price of Gold in England, 1923-1937.

December, 1931 the price of gold rose 42 percent. (Table 3) The prices of basic commodities in England rose from an index of 89 in September to 96 in December, or about 8 percent. 1/ In the meantime the world price level fell rapidly. 2/

From August to December, 1931, the price of gold in terms of the pound sterling increased about 42 percent. During the same period the world price level fell about 16 percent. The price of wheat in England rose from an index of 50 in August to 82 in November and declined to 72 in December. The price in five countries in gold fell from an index of 46 in August to 43 in September, increased to 56 in November and declined to 49 in December. 3/

After a fall in the price of gold from December, 1931 to March, 1932, the price gradually increased until the index number of price stood at 173 (par = 100) in March, 1935. Since that time it has declined slightly, remaining comparatively stable.

The price of wheat at Liverpool continued to fluctuate above the level in five countries. (Figure 16) During the calendar year 1933, the spread between prices at Liverpool and the level in five countries tended to narrow. The price of gold had declined somewhat and fluctuated during the first portion of the 1933 calendar year. Because of the fact that local supply and demand influences are not eliminated in Figure 16, it is possible that such may have tended to cause the narrowing spread during that year.

1/ See Table 5 in Warren and Pearson, "World Prices and the Building Industry, page. 24.

2/ See Farm Economics No. 110. Basic commodity prices in England seemed to fluctuate independently of the world level during this period.

3/ See Tables 14, 20 and 21.

After the 1932 crop year and a portion of 1933, the spread between Liverpool prices and those in five countries widened. The price of gold in the meantime had been increasing. From March, 1935 to September, 1935 the price of gold declined slightly. The spread during this time tended to narrow, but it is possible that local supply and demand conditions may have caused considerable decline in Liverpool prices relative to those in five countries during the latter portion of the 1935 crop year.

Although during the crop years 1936 and 1937 the price of gold declined slightly, for all practical purposes it was comparatively stable.

In the same period wheat prices in England, as well as those in five countries, increased, although the increase at Liverpool was greater than the average in five countries. The rise in all countries during this time can possibly be attributed mainly to the increase in the world price level. (Figure 11). It is possible that the greater increase at Liverpool may have been due to certain local influences. During 1937 wheat prices in all five countries declined.

THE CORRELATION OF WHEAT PRICES

Association of Supply and Price

It is possible to refer to the supply of wheat at any particular time as the amount available for sale. It may include the amount of the current crop, plus that amount which has been carried over from the previous crop year, minus the amount which has been utilised thus far. 1/ In this study, the data relating to supply refer to the amount of wheat produced in the crop year, July to June, plus the amount of stocks or carryover on about July 1st.

One of the first factors to be considered when speaking of price fluctuations and causes thereof is the supply of the particular commodity concerned.

In an attempt to measure the association of the supply of wheat with the price at various markets, coefficients of correlation have been calculated. (Table 22).

The coefficient of gross correlation is a statistical device used to measure the degree of association between two variables. Some of the conditions which are assumed when one uses this measure of relationship are: First, that the values of the variables have random fluctuations; second, that the law of relationship between the variables is constant throughout the period, which seldom occurs in a time series; third, that if linear correlation is used, a straight line best fits the

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1/ Supply may refer to the amount which will be offered for sale at a given price, at a given time and at a given market.

relation between the two variables and fourth, that the deviations from the average in the case of each variable are normal. If the method of first differences is used, as was in this study, and if the series has cyclical movements, the coefficients thus calculated may result in false conclusions. 1/

There is probably little doubt that a correlation analysis of wheat prices and their relation to supply and production have definite limitations. It is probable that many of the factors which would be used have joint relationships. 2/ That is, a change in the dependent variable due to changes in the independent variable depends upon the magnitude of another or other independent variables. For instance, it is possible that the importance of world production on domestic wheat prices depends to some extent on the magnitude of United States production. It is also possible that the influence of production in Argentina and Australia on prices in Liverpool depends to some extent on the magnitude of production in Canada, the United States and other surplus regions. To the writer, it seems that production and supply factors are so inter-related with price that the use of linear, multiple and partial correlation is restricted in a study of wheat prices.

In the use of gross linear correlation no attempt has been made to place special emphasis on the results obtained and the few concrete statements made should be taken in the light of the limitations of

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1/ See Mills, F. C. Statistical Methods, 1938 Edition, Henry Holt and Company, New York, and Timoshenko, V. P., Wheat Prices and the World Wheat Market, Cornell Expt. Station Memoir No. 118, March, 1928.

2/ Warren, Stanley M., Memoir No. 141, Cornell University Expt. Station.

this method of analysis.

As has been stated previously, a coefficient of correlation of 1 is perfect and a minus sign signifies inverse relationship, while a plus sign signifies direct relationship.

Unless otherwise noted, the period covered in all correlations was from 1921 to 1937 (crop years), and in no case was the calculated coefficient adjusted for the number of observations.

In an attempt to determine the association between supply and price it was necessary to "eliminate" the influence of changes in the value of money. This was done by putting price in terms of purchasing power. In most cases the index numbers of the prices of all-commodities as prepared by the Bureau of Labor Statistics, converted to a 1910-1914 base and crop year average, were used for this purpose. The Liverpool prices of Imported Parcels were deflated by use of the Statist index of the wholesale prices of 45 commodities in England. 1/ In some instances the price of wheat was deflated by index numbers of the prices of 40 basic commodities, and when such occurred notation is given. 2/

When the world total supply of wheat, excluding the Union of Soviet Socialistic Republics and China, for the crop year, July-June, was correlated with the July-June average deflated price of Imported Parcels at Liverpool, a coefficient of -0.835 was obtained. 3/ This

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1/ Table 42.

2/ See Table 41 for index numbers of the prices of 40 basic commodities.

3/ Prices of Imported Parcels are average prices of all recorded sales of wheat on the British "parcels" market. Parcels are less than cargo lots. See "Wheat Studies" of the Food Research Foundation of Stanford University, Volume XV, No. 3, for the representativeness of such a series.

tends to show the close association of year to year price changes at Liverpool to changes in the world supply of wheat. The coefficient of determination, which is a measure showing the percent of variation in price, accounted for by variations in supply, was 0.697.

Kansas City prices of No. 2 Hard Winter wheat for the crop year July-June, when correlated with world supply, resulted in a coefficient of -0.572. This is considerably lower than the coefficient obtained for Liverpool prices and world supply (r = -.835). This tends to show that during the period 1921 to 1937 prices at Liverpool were associated more closely with world supply than prices at Kansas City. Liverpool prices are not influenced greatly by domestic production because such a small portion of the total wheat utilized in the United Kingdom is produced there. During a portion of the period, especially in the years 1933, 1934 and 1935, prices in the United States were above the world level due to short crops. In these years tariff restrictions and low production probably influence domestic prices more than world conditions. Ordinarily, the United States is a surplus producer and prices in this country correspond rather closely to prices in other countries. 1/ In these years of low production the United States was on an import basis for certain classes of wheat which were used for seed and flour. It is probable that the correlation between Kansas City prices and world supply would have been greater if the period covered had been longer and had included more years when we were, as we usually are, producers for export.

1/ See Figure 10.

Kansas City prices of No. 2 Hard Winter were again correlated with world supply, although this time instead of deflating the prices with index numbers of the prices of all-commodities, basic commodities were used. This method resulted in a coefficient of -0.562. This is slightly less than that obtained when all commodities were used (r = -0.572). Deflating a price series by basic commodities results in an elimination of a larger amount of the fluctuation in price, thus leaving less to be explained by supply and demand. A slightly smaller coefficient could probably be expected.

Work should be conducted to determine which type of index best eliminates the influence of changes in the value of money.

When Minneapolis prices of No. 1 Dark Northern Spring were correlated with the world supply of wheat, a coefficient of -0.768 was obtained. This is lower than that obtained for Liverpool but greater than that obtained for Kansas City.

When prices at Minneapolis were correlated with prices at Liverpool a coefficient of + 0.643 resulted, while when Kansas City prices were correlated with Liverpool prices a coefficient of + 0.544 was found.

In work conducted by Doctor Timoshenko in his study "Wheat Prices and the World Wheat Market", it was found that during the period 1892 to 1913 the gross correlation between Minneapolis and Liverpool prices was + 0.710 and between Kansas City prices and Liverpool prices + 0.767. 1/

1/ Timoshenko, op. cit., p. 57.

He also found a higher correlation between Minneapolis prices and world production than between Kansas City prices and world production. Liverpool prices were more highly correlated with world production than either Kansas City or Minneapolis prices.

Because of the fact that Minneapolis prices represent spring wheat, of which little is usually exported, and Kansas City prices represent hard winter wheat, which tends to be one of the classes usually exported, it would be expected that world conditions affecting our exports of wheat might have slightly more influence on prices at Kansas City than at Minneapolis. Although it is possible that such could be true, it is difficult to prove. At the present the writer is unable to give a satisfactory explanation for the closer correlation between Minneapolis prices and world supply than between Kansas City prices and world supply. It is possible that the Minneapolis futures market may give more recognition to Liverpool prices than the Kansas City market. It seems reasonable to expect that if Liverpool prices are more highly correlated with world supply than either Minneapolis or Kansas City prices, and if Minneapolis prices are more highly correlated with world supply than Kansas City prices, then Minneapolis prices should be more closely associated with Liverpool prices than are Kansas City prices.

When Minneapolis prices were deflated by index numbers of 40 basic commodities and correlated with world supply, a coefficient of -0.728 was found. This is lower than that obtained when the prices were deflated with index numbers of the prices of all commodities ($r = -0.768$).

Again, less of the fluctuations are left to be accounted for when basic commodities are used than when all-commodities are employed.

The world supply for the crop year July-June was correlated with the North Dakota August-September average farm price and a coefficient of -0.620 was obtained.

Association of Production and Price

The association of the July-June world production of wheat to the crop year average price of Imported Parcels at Liverpool during the period 1921 to 1937, as measured by the coefficient of gross correlation, was less than that obtained when Liverpool prices were correlated with world supply. The former association was r = 0.726 while the latter was r = -0.835.

Doctor Timoshenko using a similar method, but using actual prices rather than purchasing power, prices of red wheat instead of Imported Parcels, and for the period 1892 to 1913, obtained a correlation of r = 0.730 between world production and Liverpool prices. 1/ The fact that these coefficients are approximately the same may be due to chance, but they are probably large enough to show the association of Liverpool prices and world production.

The coefficient of correlation obtained between Kansas City prices of No. 2 Hard Winter wheat and world production for the 1921 to 1937 period was r = -0.489. It is probable that this coefficient is less than would be obtained if a longer period was covered. The domestic

1/ Timoshenko, op. cit., p. 24.

wheat situation relative to the world situation during the period 1933 to 1936 was peculiar. The United States ordinarily is a surplus producer but in these years, due to extremely short crops, we were on an import basis for certain types of wheat. During this period prices in the United States were above the world level due principally to low production and a high tariff. Because of this, it is probable that domestic prices were influenced more by local than world conditions. Omitting monetary influences, it has been shown that wheat prices in the United States correspond quite closely to those in other countries and only under extreme local influences do they deviate considerably from the world level.

In an attempt to further analyse Liverpool prices, a correlation was worked out between production in the Northern Hemisphere and spring to fall changes in price. In order to make the result as comparable as possible with that obtained by Doctor Timoshenko in his correlation of the same factors, his method was followed. The principal differences in the two are the grades of wheat used and the period covered. Doctor Timoshenko used the prices of red wheat of good average quality, while the writer used the prices of Imported Parcels. The period covered by Doctor Timoshenko included the years 1892 to 1913, while the writer covered the years 1921 to 1937.

Prices at Liverpool are influenced by production in both Northern and Southern Hemispheres. Harvest in the Southern Hemisphere is usually completed in the months of December and January, and the

crop's influence on price is the greatest in the late winter and spring. Harvest in the Northern Hemisphere begins in the spring and continues until late fall. It seems logical that during this period prices at Liverpool should be influenced by Northern Hemisphere production.

To determine the association between Northern Hemisphere production and spring to fall changes in price at Liverpool, the monthly prices for April and May were averaged and taken as representative of spring prices, while to represent fall prices the monthly prices for September and October were averaged. In eliminating the affect of seasonal variation, the average difference between prices in April-May and September-October for the 18 years, 1920 to 1937, was determined and this added to the yearly difference between spring and fall prices. The corrected difference between spring and fall prices was then correlated with Northern Hemisphere production and a coefficient of -0.80 was obtained. The coefficient tends to show that a considerable amount of the change in price from spring to fall at Liverpool is associated with the size of the crop in the Northern Hemisphere. Doctor Timoshenko found the relation to be slightly higher for the period 1892 to 1913. He obtained a coefficient of gross correlation of -0.87.

When Kansas City prices of No. 2 Hard Winter wheat were correlated with Minneapolis prices of No. 1 Dark Northern Spring for the period 1921 to 1937, a coefficient of + 0.604 resulted. This was

less than the correlation between Minneapolis and Liverpool prices ($R_{12} = +0.643$) and more than the association of Kansas City and Liverpool prices ($R_{12} = +0.544$).

Supply - Price Curves for Wheat

In an effort to show the relationship of various supplies of wheat to various prices, several supply-price curves have been calculated.

In some cases production data have been used to represent a portion of supply. In these instances, it should be remembered that the supply-price relationships, mathematically determined, consider only a part of the total supply which may be available and influencing price.

When farm prices were not used, wholesale quotations at terminal markets have been employed. Although the terminal market prices do not represent what the farmer receives, they are in many instances the basis from which country elevator prices are quoted to the producer. 1/

Method of Calculation

The method used in the calculation of the supply-price curves is that worked out by Doctors Warren and Pearson, and taken from their bulletin "Interrelationships of Supply and Price". 2/

1/ See discussion entitled "Price Determination in the Marketing Process," page 39.

2/ For detailed method see Warren, G. F. and Pearson, F. A., "Interrelationships of Supply and Price, Cornell University Agricultural Experiment Station Bulletin 466, March, 1928.

There were two purposes in using this method. First, after considering several other formulae and methods of calculation, the writer came to the conclusion that their method would probably give as accurate results as any other, and second, the writer wished to make certain comparisons between curves calculated by the above mentioned authors and the ones he has computed. If such was to be done, a comparable method was necessary.

In all cases of calculation, price was stated in terms of purchasing power by dividing the price by the index numbers of the prices of all-commodities as calculated by the Bureau of Labor Statistics, converted to a 1910-1914 base. All references to price in this section are in reality a reference to purchasing power.

In all instances where yearly prices were used, they are crop year, July-June, averages, the averages of the index numbers of the prices of all commodities employed in determining purchasing power were placed on a crop year basis. 1/

In calculating the mathematical curve fitting the relation between supply and price, the equation $I = \frac{b}{x^a}$ was used. When placed in the form of logarithms it becomes $\log y = b - a \log x$. The constants log b and a are determined by the solution of the two normal equations $-\Sigma(\log x)^2 (a) + \Sigma \log x (\log b) - \Sigma \log x \log y = 0$ and $-\Sigma \log x (a) + \Sigma a \log b - \Sigma \log y = 0$.

The calculated curves are based upon the relation of the percent that production or supply is in a given year of the average for the

1/ Where monthly prices were employed they were deflated by use of corresponding monthly index numbers of the prices of all commodities on a 1910-1914 base.

preceding five years, to the percent that price is in the corresponding year to the average for the five years preceding. Such a procedure tends to take into account changes in supply and demand over periods of time, and the elimination of short term movements of price and production or supply, as a base against which comparisons in individual years were made. The procedure amounts to five year moving averages of price and production or supply.

Instead of using absolute figures, logarithms were used in all instances. Normal values are based upon the five year moving averages of supply and price, each being considered 100.

After obtaining the constants log b and a, it was necessary to adjust the final estimating equation so that when supply equalled 100, price equalled 100. These adjustments were necessary to "eliminate" certain other factors tending to influence price. In some cases it may have been due to the tendency of price to increase or decrease in purchasing power. 1/ The revised equations were used in calculating the curves shown in the illustrations.

Instead of placing all prices on a 1910-1914 base by transferring them into index numbers, before dividing by the index numbers of the prices of all commodities, actual prices were used in stating the data in terms of purchasing power. The result was the price of wheat in terms of dollars having the same value in purchasing all commodities as the dollar had in the 1910-1914 period. The same shaped curve will result in both cases.

1/ See Warren and Pearson, "Interrelationships of Supply and Price", page 119.

The period covered included the years 1920 to 1937, but due to the fact that five year moving averages were used as normal, the actual curves are based on the period 1925 to 1937.

The relations between supply and price are shown in Table 23. The original and revised equations are shown in Table 24.

Relation of Supply and Production to Price

The relation between the July-June crop year average price of Imported Parcels at Liverpool and the crop year world supply of wheat, excluding the Union of Soviet Socialistic Republics and China, is shown in Figure 17.

During the period 1925 to 1937 when the world supply of wheat was 10 percent below the average for the preceding five years, prices of Imported Parcels at Liverpool tended to be 17 percent above the average for the five years preceding. When the world supply was 10 percent above the preceding five year average, prices at Liverpool tended to be 13 percent below the preceding five year average. A given percentage increase in the world supply tended to result in a less striking affect on price than the same percentage decrease in supply. In other words, a deficit supply has a greater influence on price than a surplus supply.

During the same period, when the world supply of wheat was 10 percent above normal (preceding five year average) prices of No. 2 Hard Winter wheat at Kansas City were 17 percent below normal (preceding five year average). (Figure 18). A world supply 10 percent below normal tended for prices of No. 2 Hard Winter at Kansas City 23

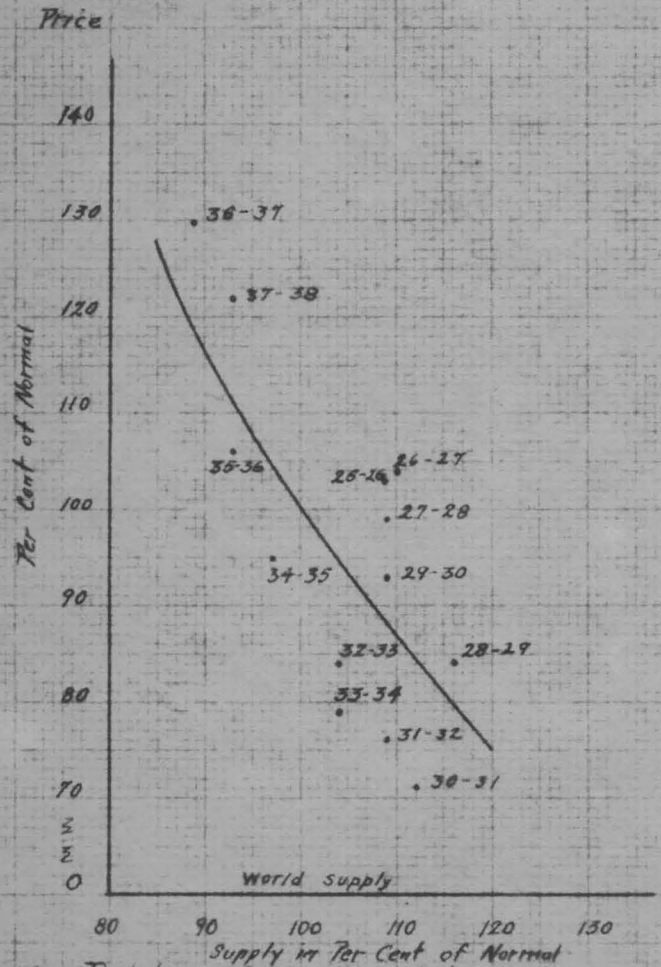

Fig. 17. - Relation of World Total Supply of all Wheat to the purchasing power of Imported Parcels in Liverpool.
1925-26 to 1937-38

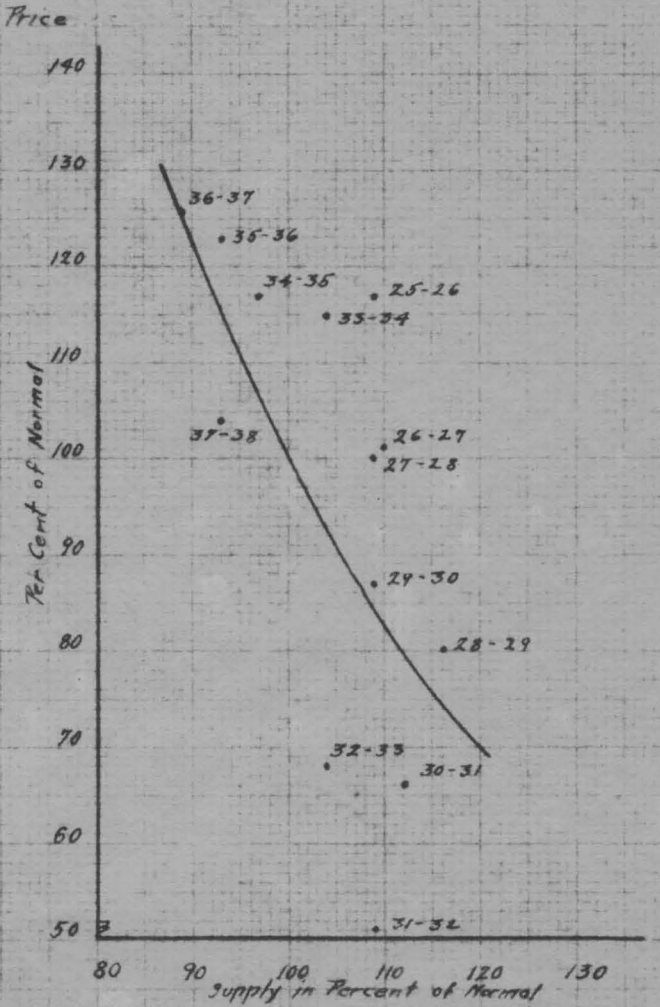

Fig. 18. - Relation of World Total Supply of all Wheat to the Purchasing Power of No. 2 Hard Winter at Kansas City.
1925-26 to 1937-38

percent above normal. Again, a given percentage decrease in the world supply had a greater influence on prices than the same percentage increase in supply.

When the world supply was 5 percent above normal (preceding five years average) prices at Kansas City tended to be 9 percent below normal (preceding five year average), while when the supply was 5 percent below normal, the price was 11 percent above normal.

During the period, a given percentage increase in the world supply of wheat was accompanied by lower prices at Kansas City than at Liverpool. A supply 10 percent above normal tended to give a price of wheat at Kansas City 17 percent below normal and at Liverpool 13 percent below normal. Similarly, a 10 percent decrease in the world supply was accompanied by prices at Liverpool 17 percent above normal and prices at Kansas City 23 percent above normal. A given percentage decrease in the world supply had a more striking influence on prices at Kansas City than at Liverpool.

England is definitely a deficit area while the United States is a surplus producing country and it is to be expected that prices at Kansas City would tend to fluctuate more violently than prices at Liverpool. 1/

Figure 19 shows the relation of world production of wheat to the price of No. 2 Hard Winter wheat at Kansas City for two different periods. The curve for the period 1899 to 1913 was calculated by Doctors Warren and Pearson and taken from their bulletin "Interrelationships of Supply and Price", while that for the period 1925 to

1/ See Warren and Pearson, "Interrelationships of Supply and Price", op. cit., p. 60.

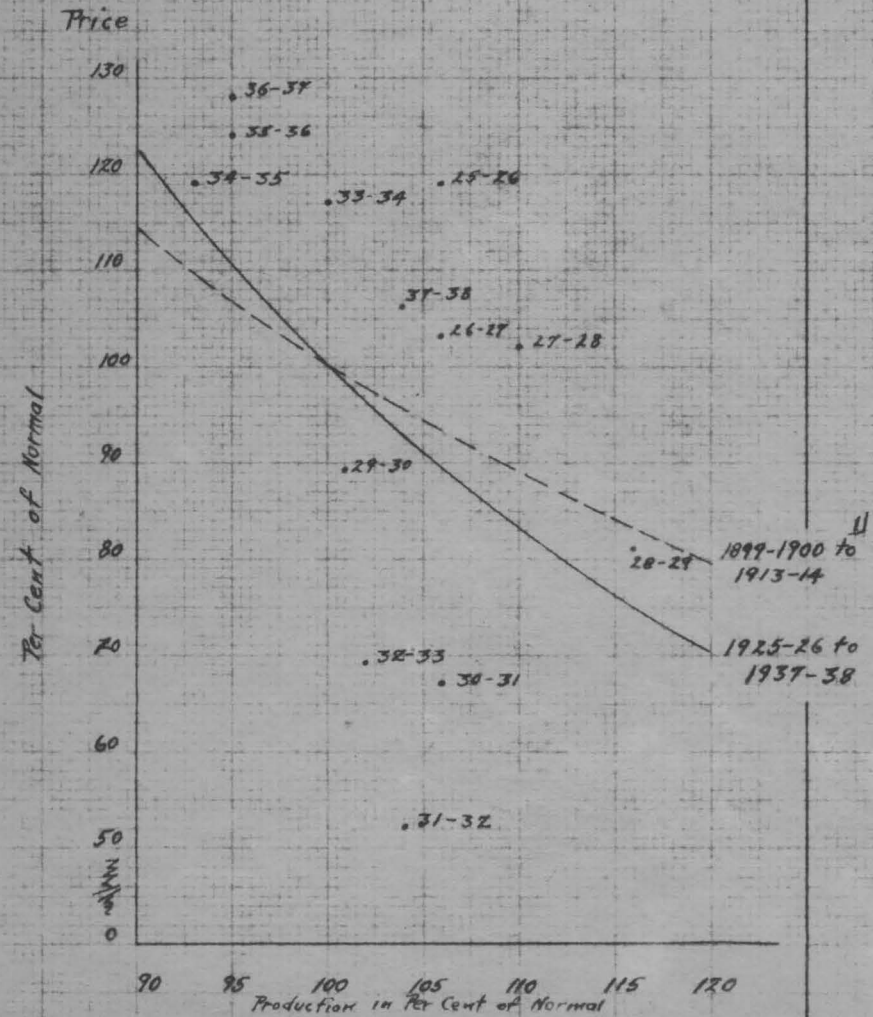

Fig. 19 - Relation of World Production of Wheat to the Purchasing Power of No. 2 Hard Winter at Kansas City, 1925-26 to 1937-38 and 1899-1900 to 1913-14.

1] Calculated by Warren, G.F. and Pearson, F.A., Interrelationships of Supply and Price, Cornell University, Agricultural Experiment Station, Bulletin 466, March 1928

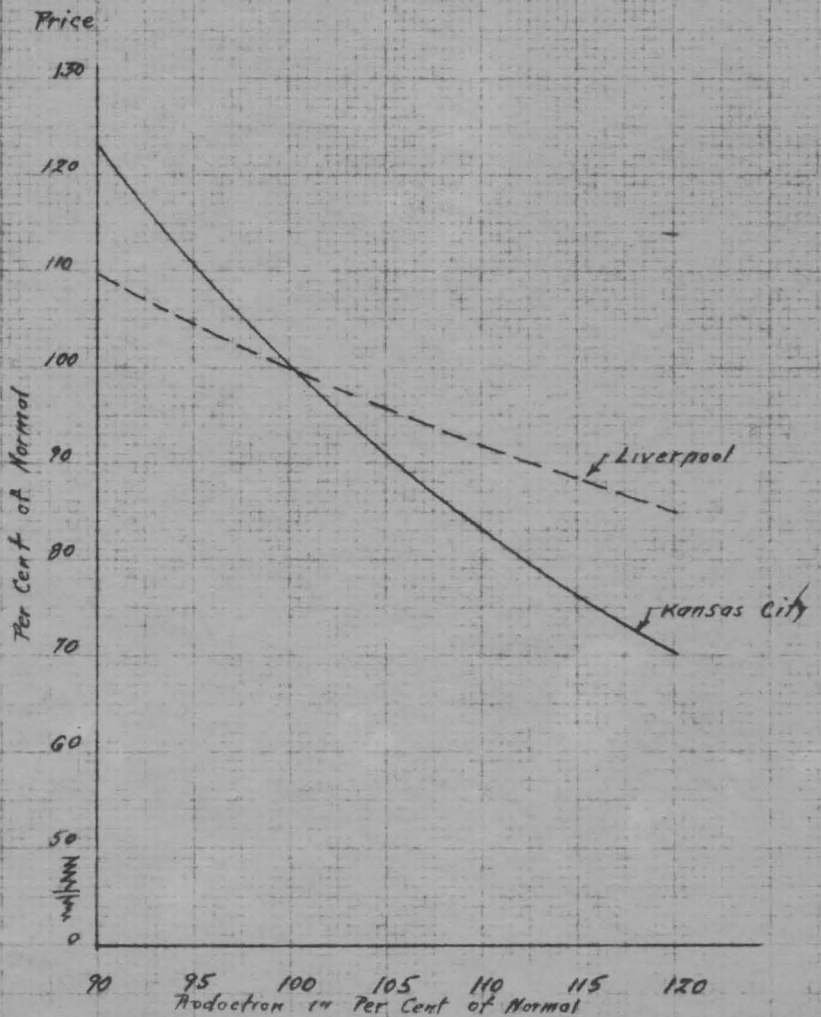

Fig. 20 - Relation of World Production of Wheat to the purchasing Power of No. 2 Hard Winter at Kansas City and Imported Parcels at Liverpool, 1925-26 to 1937-38.

1937 was calculated by the writer.

During the period 1899 to 1913 when the world crop was 10 percent above normal, prices at Kansas City were 12 percent below normal, while in the period 1925 to 1937 the same size world crop gave prices at Kansas City 17 percent below normal. A world production of 10 percent below normal tended for prices at Kansas City 14 percent above normal in the earlier period and 23 percent above normal in the later period. The data give a tendency to show that prices at Kansas City fluctuated more violently with a given world production in the period 1925 to 1937 than in the period 1899 to 1913. It is possible that the more violent changes in the later period may be accounted for by increased commercialization of agriculture and by inherent changes in our economic organization.

During the period 1925 to 1937, a world crop 10 percent above normal had a more striking influence on the price of wheat at Kansas City than at Liverpool. A world production of 10 percent below normal caused a greater change in prices at Kansas City than at Liverpool. When the world crop was 10 percent above normal, wheat prices at Kansas City were 17 percent below normal, while those at Liverpool were 8 percent below normal. When world production was 10 percent below normal, prices at Kansas City were 23 percent above normal, while prices at Liverpool were 10 percent above normal (Figure 20).

During the same period (Figure 21) a given size world supply of wheat tended for a more striking influence on prices at Kansas City than a proportionate size United States supply. When the

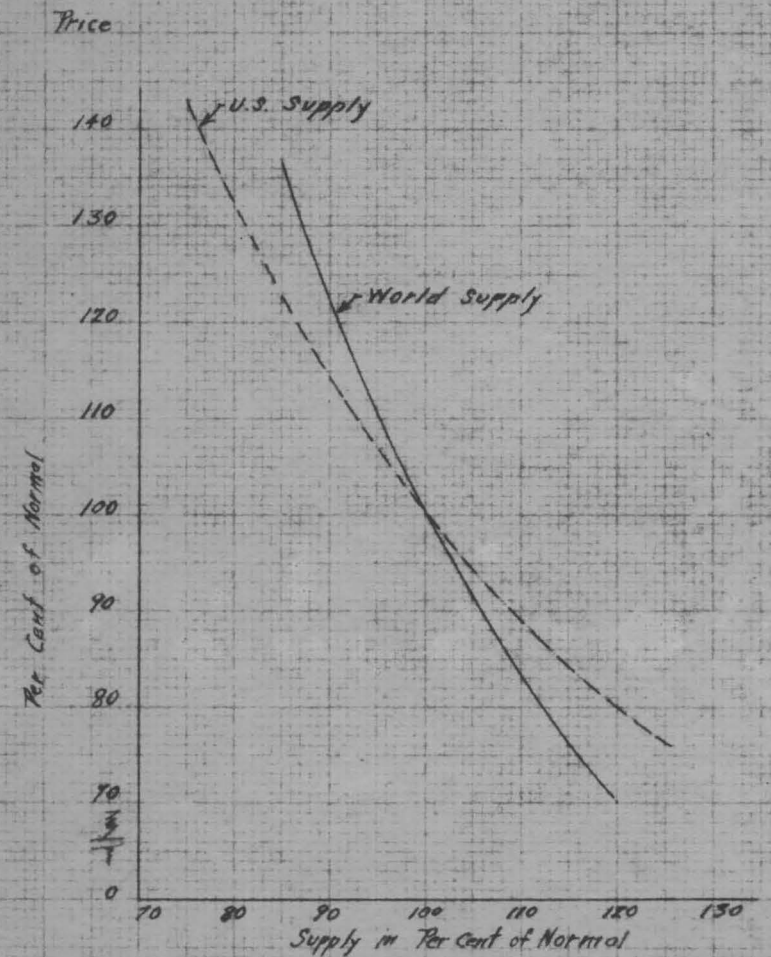

Fig. 21.- Relation of World Supply and U.S. Supply to the Purchasing Power of No. 2 Hard Winter of Kansas City, 1925-26 to 1937-38.

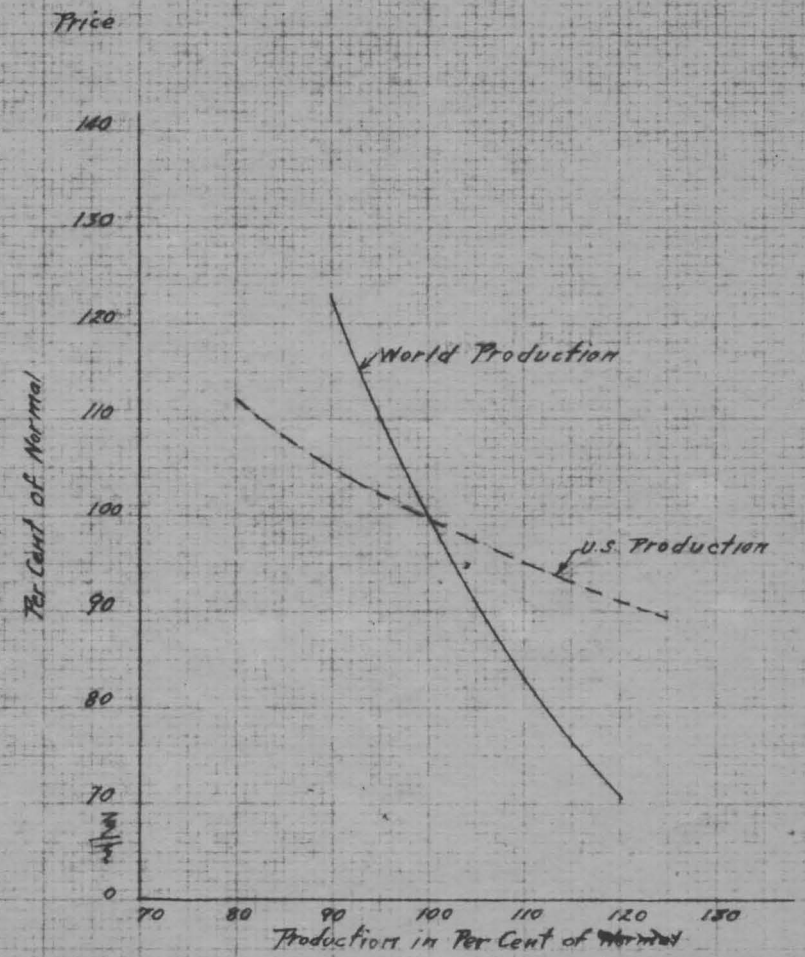

Fig. 22.- Relation of World Production and U.S. Production to the Purchasing Power of No. 2 Hard Winter at Kansas City, 1925-26 to 1937-38.

world supply of wheat was 10 percent above normal, prices at Kansas City were about 17 percent below normal, while a United States supply 10 percent above normal gave prices at Kansas City 11 percent below normal. A world supply 10 percent below normal was accompanied by prices at Kansas City 23 percent above normal, while a United States supply 10 percent below normal gave prices 14 percent above normal.

Although during the period 1925 to 1937 United States production of wheat was so variable that deviations from the calculated curve were large, the data tended to show that prices of No. 2 Hard Winter wheat at Kansas City were influenced more by world production than United States production. When the United States production was 10 percent above normal, prices at Kansas City were 5 percent below normal, with a world crop 10 percent above normal, prices were 17 percent below normal. A world production 10 percent below normal gave prices at Kansas City 23 percent above normal, while a United States crop 10 percent below normal raised prices 5 percent above normal (Figure 22).

Doctors Warren and Pearson found that during the period 1899 to 1913 a world crop of wheat 10 percent above normal caused Kansas City prices of No. 2 Hard wheat to fall 11 percent below normal, while a 10 percent above normal United States crop gave Kansas City prices 10 percent below normal. When the world production was 10 percent below normal, prices at Kansas City were 14 percent above normal, a United States production 10 percent below normal gave

prices 12 percent above normal. They also found that world production was inclined to have more influence on the Minnesota farm price than did United States production. 1/

Figure 23 shows the relation between the United States total supply of wheat and the prices of No. 2 Hard Winter wheat at Kansas City for the period 1925 to 1937. When the domestic supply of wheat was 20 percent above normal, yearly prices at Kansas City were 20 percent below normal, while a supply 20 percent below normal gave prices at Kansas City 32 percent above normal.

In an attempt to show the influence of the United States supply of wheat on farm prices in surplus and deficit producing areas, curves were calculated for the states of Georgia, (deficit area) and North Dakota (surplus area).

When the United States supply of wheat was 10 percent above normal, the August-September average farm price in North Dakota was 14 percent below normal. When the United States supply was 10 percent below normal, the price received by producers in this surplus area was 18 percent above normal (Figure 24). 2/

Figure 25 shows the relation between the United States supply of wheat and the August-September average farm price in Georgia. When the supply was 10 percent above normal, the Georgia farm price during

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1/ Warren and Pearson, "Interrelationships of Supply and Price", op. cit., p. 67 and 110.

2/ North Dakota prices obtained from Fuller, O. M. and Willard, Rex E., Prices of North Dakota Farm Products, Bulletin 232 and Brown, Willard O., and Miller, Cap E., Prices of North Dakota Farm Products, Mimeograph Supplement, North Dakota Agricultural Experiment Station.

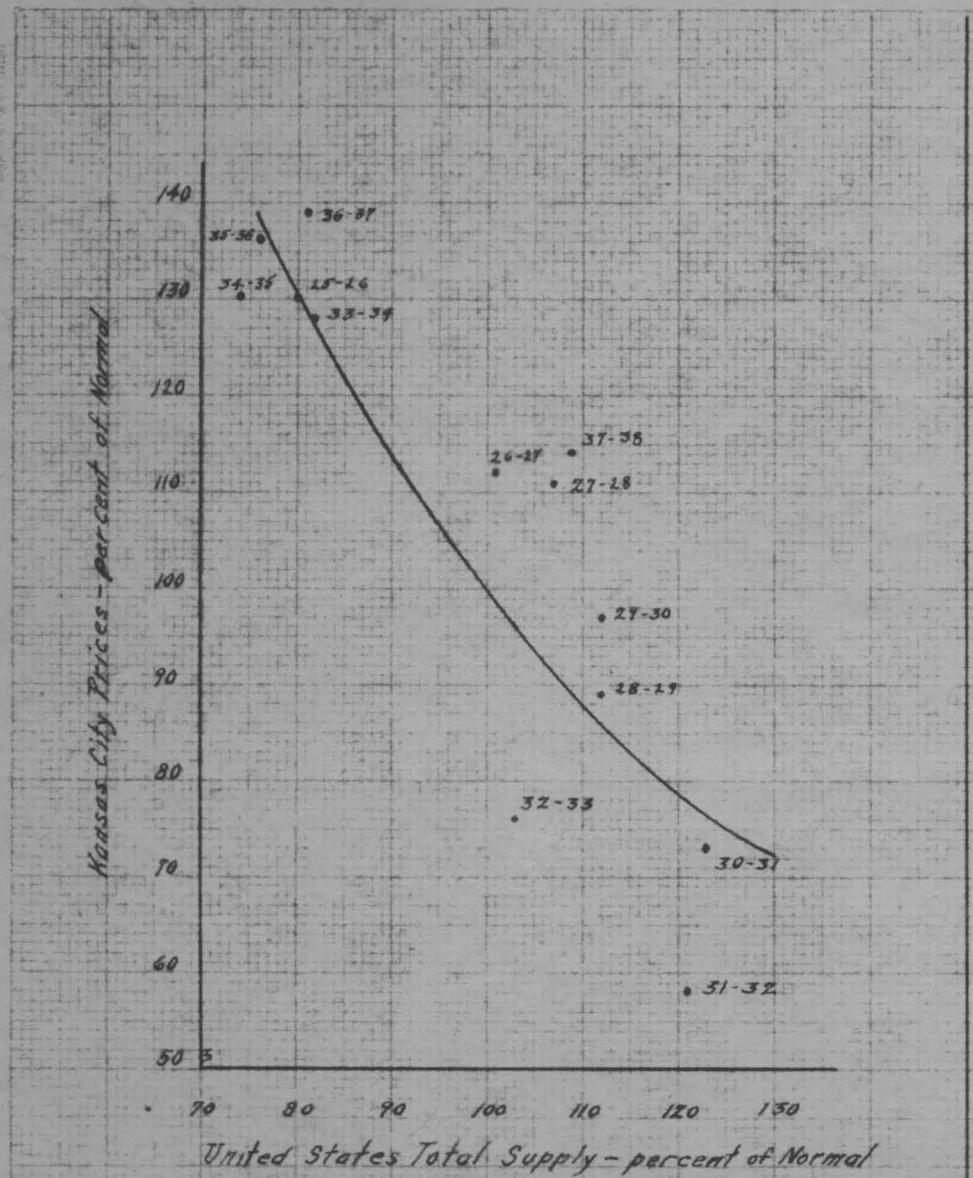

Fig. 23 - Relationship between United States Total Supply of All Wheat and the Purchasing Power of No. 2 Hard Winter at Kansas City 1925-26 to 1937-38

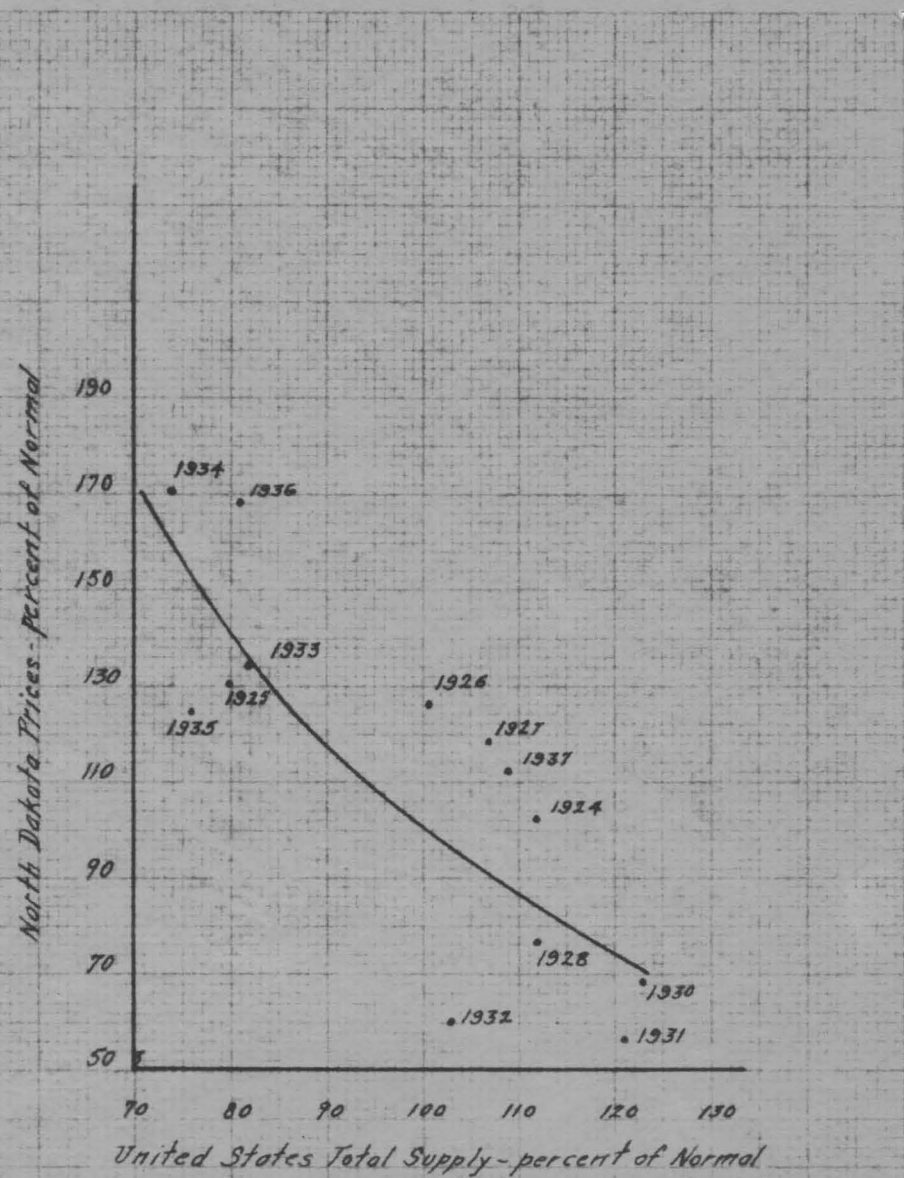

Fig. 24. - Relationship between United States Total Supply of all Wheat and the purchasing Power of the Aug. - Sept. Average price Received by Producers in North Dakota. 1925-26 to 1937-'38

August and September was 4 percent below normal. When the United States supply was 10 percent below normal, the price received by producers in Georgia was 5 percent above normal. 1/

A 20 percent above normal supply of wheat in the United States lowered prices in North Dakota 25 percent below normal and in Georgia 8 percent below normal. When the United States supply was 20 percent below normal, Georgia farm prices were 10 percent above normal, while North Dakota farm prices rose 42 percent above normal. In both states a given percentage increase in the United States supply had a less striking influence on price than the same percentage decrease in supply (Figure 26).

In the period 1925 to 1937 when the United States supply of all wheat was 20 percent below normal, the June price of No. 1 Dark Northern Spring at Minneapolis was 24 percent above normal, while when the United States supply of wheat was 20 percent above normal, the June price in Minneapolis fell 16 percent below normal. When the domestic supply was 10 percent below normal, the price in June was 11 percent above normal, while a supply 10 percent above normal depressed June prices 9 percent below normal. A given decrease in the United States supply of wheat had more affect on the June price at Minneapolis than a similar increase in supply (Figure 27).

England draws her supply of wheat primarily from the surplus areas of Canada, the United States, Argentina and Australia. The

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1/ Georgia prices obtained from United States Department of Agriculture, Prices Received for Farm Products - Southeastern States, Statistical Bulletin 16, and Crops and Markets.

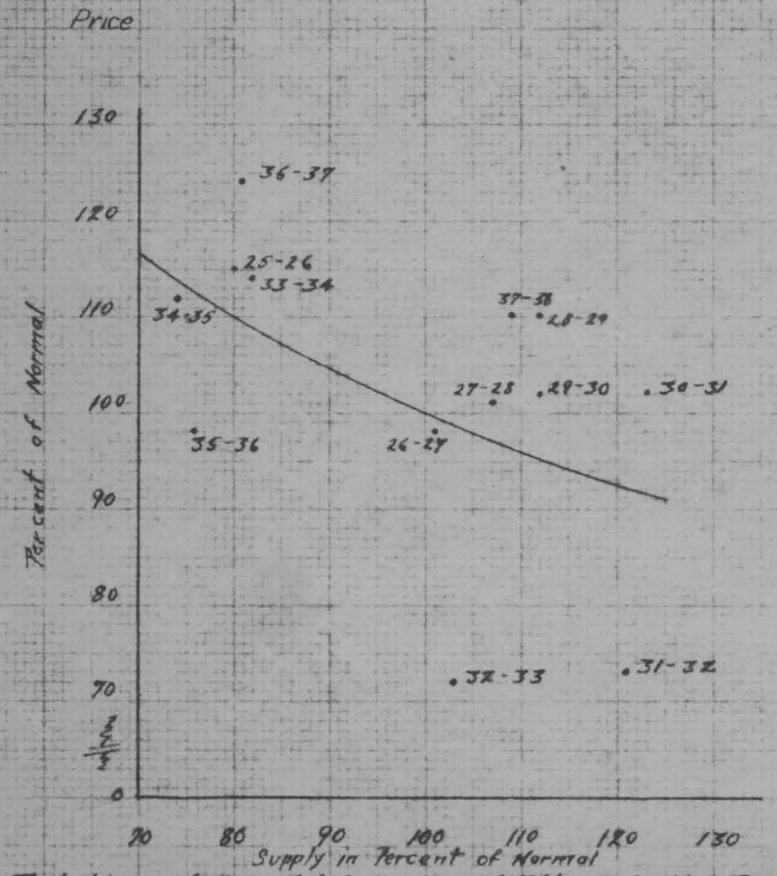

Fig.25.- Relation of U.S. Total Supply of Wheat to the Purchasing Power of the Aug.-Sept. Average Farm Price in Georgia, 1925-26 to 1937-38.

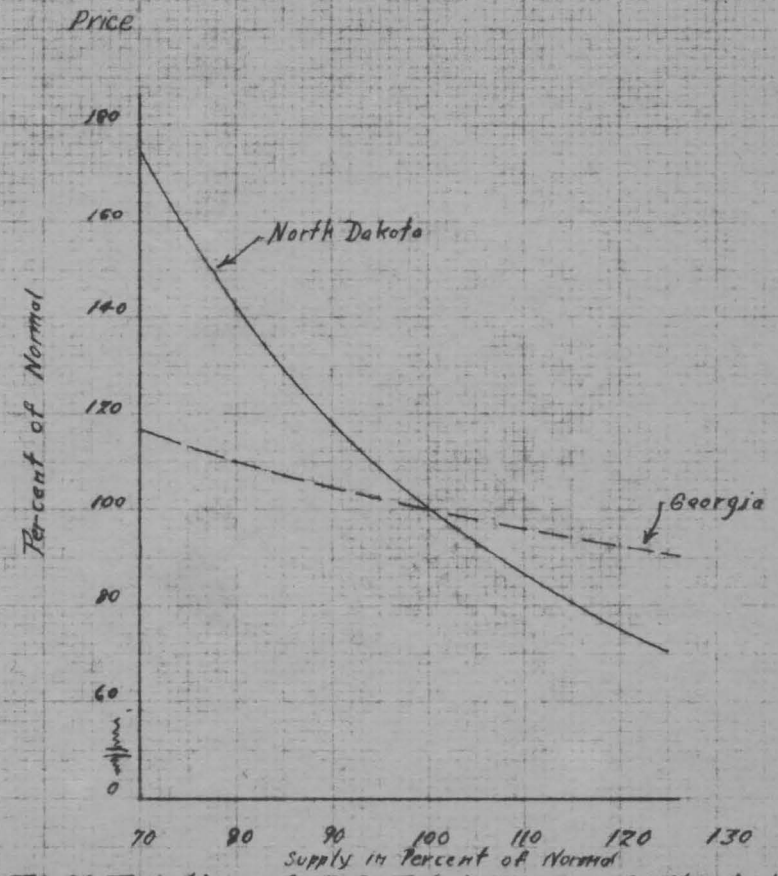

Fig.26-Relation of U.S. Total Supply of Wheat to the Purchasing Power of the Aug.-Sept. Average Farm Price in North Dakota and Georgia, 1925-'26 to 1937-'38

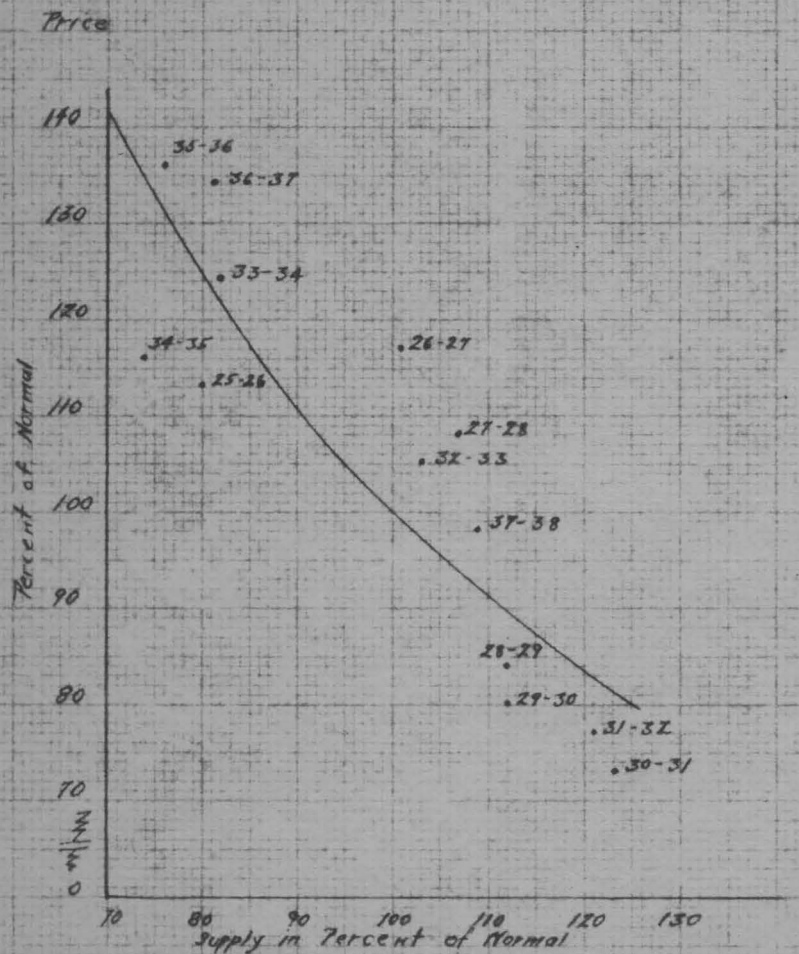

Fig. 27- Relation of U.S. Total Supply of Wheat to the Purchasing Power of the June Price of No 1 Dark Northern Spring at Minneapolis, 1925-26 to 1937-38.

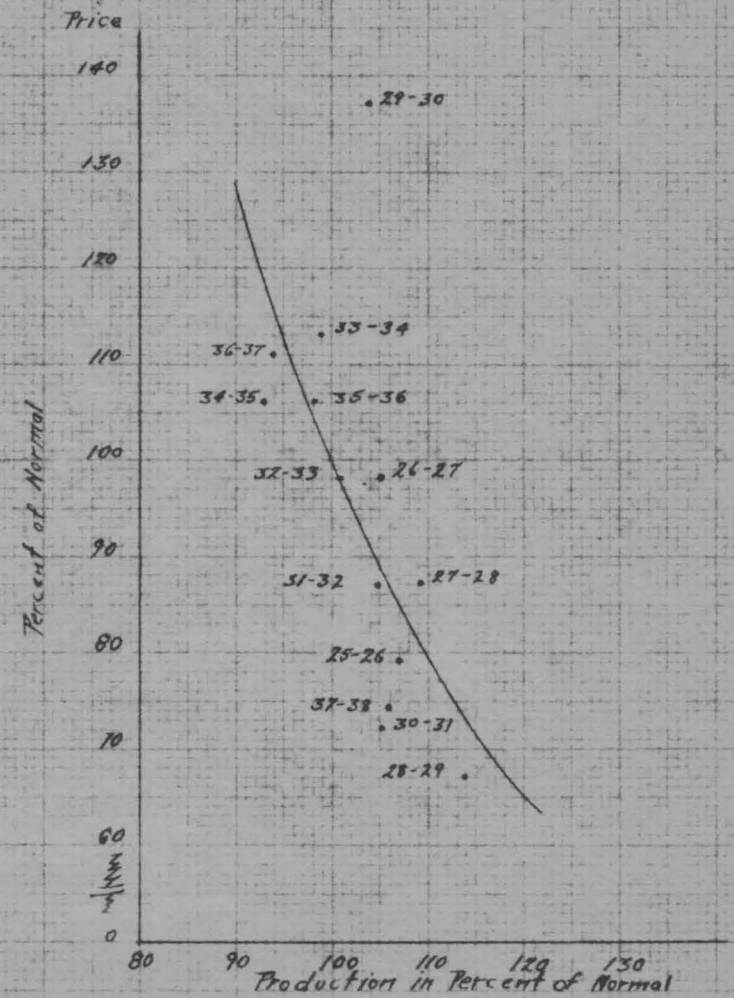

Fig. 28- Relation of Northern Hemisphere Production of Wheat to the Changes in Price from April-May to Sept.-Oct. in Cents per Bushel of Imported Parcels of Liverpool, 1925-26 to 1937-38

harvest in Canada, the United States and other countries of the Northern Hemisphere takes place from May to September. Prices at Liverpool during this period were influenced considerably by Northern Hemisphere production. 1/

In the period 1925 to 1937, a crop in the Northern Hemisphere 10 percent below normal (preceding five year average) gave a 29 percent above normal (preceding five year average) change in price from April-May to September-October of Imported Parcels at Liverpool. A Northern Hemisphere crop 10 percent above normal caused a price change in Imported Parcels at Liverpool from April-May to September-October of 21 percent below normal. Prices at Liverpool tend to be lower in the fall than spring. Large supplies arriving on the market probably accounts for this. The fall price tends to be lower after a large crop in the Northern Hemisphere than after a short crop.

1/ See discussion under "Coefficients of Correlation, Relation of Production and Price", and also Timoshenko, V. P., Wheat Prices and the World Wheat Market, Cornell University Agricultural Experiment Station Memoir 118, July, 1930.

DIFFERENTIAL PRICE BEHAVIOR AMONG THE CLASSES OF WHEAT

The price of a particular grade of a class of wheat at a terminal market in the United States is the result of the action and interaction of numerous forces, many of which are world-wide in importance and cause price adjustments in all markets. Others are national in scope, directly affecting prices in this country and sometimes those in other countries only indirectly. Usually the international forces are strongest, although at any particular time domestic influences may dominate those of world importance, causing domestic prices to deviate considerably from the world level.

Prices of one class of wheat may be high or low relative to another depending upon conditions of supply and demand for each. Prices of one grade within a class relative to another in the same class may be high or low, depending upon supply and demand conditions of one as compared to those of the other.

Price relations among the various classes of wheat are the basis for this section. This type of price behavior lends itself to analysis by the use of ratios.

The following is a statement made by Doctor Working of the Food Research Foundation of Stanford University. 1/ In speaking of differential price behavior in relation to the price series, he states "the ideal situation is found where one series responds exactly like a second series to all factors that bear on the second, and reflects, in addition,

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1/ Working, Holbrook, "Differential Price Behavior as a Subject for Commodity Price Analysis," reprint from Econometrica, Journal of the Econometric Society, Volume 3, No. 4, October, 1935.

a fairly simple body of special influences."

Prices of wheat by classes probably have enough of these characteristics to enable one to utilize a method of differential price analysis. Price differences among the classes are associated with conditions of supply and demand relative to each. In attempting to study these differences, production and price ratios were prepared showing the relationship between the production of one class of wheat as compared to another and prices of both.

If supply data were available for a longer period, it is probable that the relation would be more significant. This is also true with the prices employed. If prices were available for each class of wheat as a whole instead of specific grades within the class, the price ratios would be more comparable as between classes.

The various classes are represented by the prices at terminal markets of the following described wheats. 1/ Hard Red Spring, No. 1 Dark Northern Spring at Minneapolis; Hard Red Winter, No. 2 Hard Red Winter at Kansas City; Soft Red Winter, No. 2 Red Winter at St. Louis; Durum, No. 2 Amber Durum at Minneapolis; and White; Soft White at Portland. Weighted average yearly prices were used in all cases. (Table 26).

The first step in the calculation of the production ratio was to obtain the percent that the production of each class of wheat was of the total United States production of all wheat for each year during the period 1921 to 1937. (Table 25). As an example, to determine the

1/ The class name is given first, the grade and class of wheat represented in price second, and the terminal market last.

production ratio of hard red spring to soft red winter, the percentage value for the former was divided by the percentage value of the latter. Similar ratios were calculated for each of the 10 unlike combinations of the five classes for each year in the period 1921 to 1937.

The price ratio of hard red spring to soft red winter was obtained by dividing the yearly price of the former by that of the latter. The same procedure was followed in obtaining the price ratios for all combinations in each year. The ratios of production and price are given in Table 27. 1/

In discussing the production ratios reference is made to the percentage values when speaking of relatively high or low production.

Figure 29 shows the production and price ratios of soft red winter to hard red winter for the period 1921 to 1937. Only a glance is necessary to see the inverse relationship between the two, that is, when the production ratio is high the price ratio tends to be low and vice versa. A high production ratio may be due to a short crop of that class of wheat represented in the denominator of the fraction with average production of that class represented in the numerator. A large production of that class represented in the numerator with only average production of that class represented in the denominator will also result in a high production ratio. Varying magnitudes of production for each class will cause changes in the size of the ratios.

A small ratio may result from a large production in the class of wheat represented in the denominator with average production in the class represented in the numerator. A small production of the class

1/ All ratios were multiplied by 100.

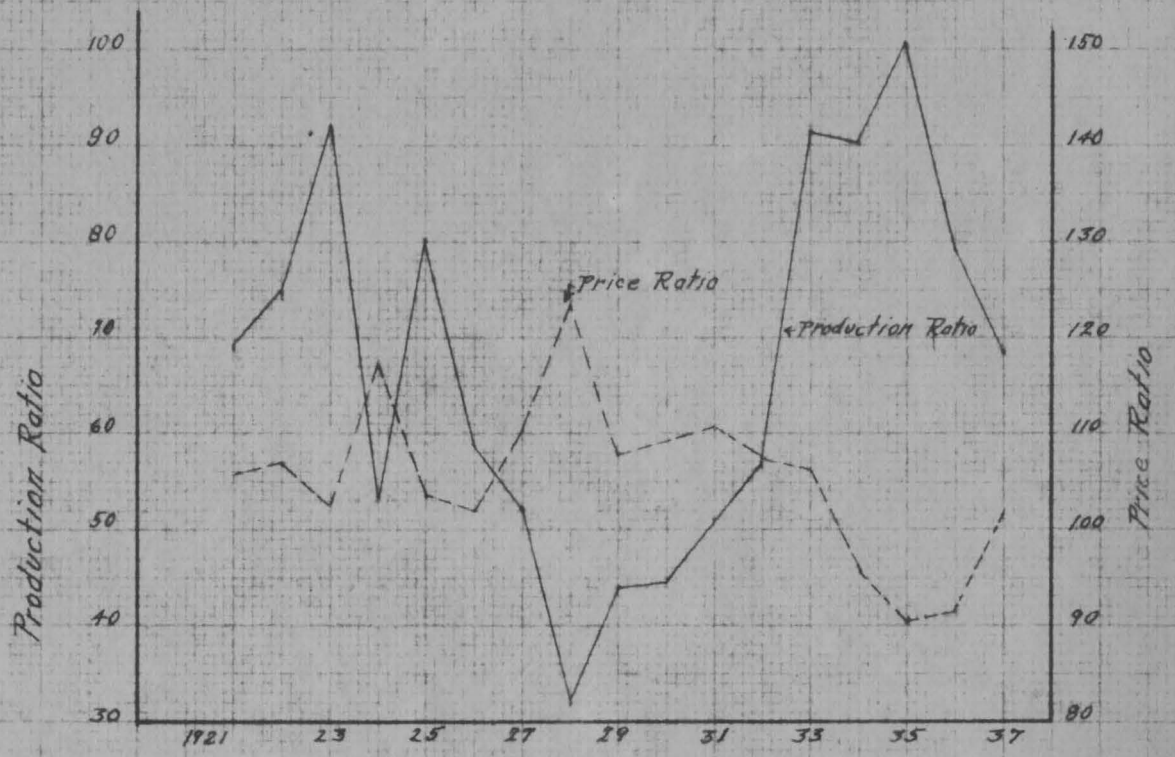
represented in the numerator with average production of the class represented in the denominator will result in a low production ratio. Varying degrees of production for each class will cause changes in the size of the ratio.

A large price ratio will result from a relatively high price for the class represented in the numerator with a relatively low price for that represented in the denominator. A small price ratio will result from a relatively low price in the numerator with a relatively high price in the denominator.

An increase in the production ratio and a decline in the price ratio tends to show that the class of wheat represented in the numerator has fallen in price relative to that in the denominator while production of that class represented in the numerator has increased relative to that in the denominator.

A decline in the production ratio and an increase in the price ratio tends to show that the class of wheat represented in the numerator has increased in price relative to that in the denominator, while production of that class represented in the numerator has fallen relative to that in the denominator.

Figure 29 indicates that in the years 1933, 1934 and 1935 the production ratios of soft red winter to hard red winter were exceptionally high. During these years the production of soft red winter had increased relative to the total United States production, while hard red winter had declined. The price ratios for this period decreased showing that relative to the price of hard red



Production and Price Ratios of Soft Red Winter and Hard Red Winter Wheats, 1921-1937
Fig. 29.

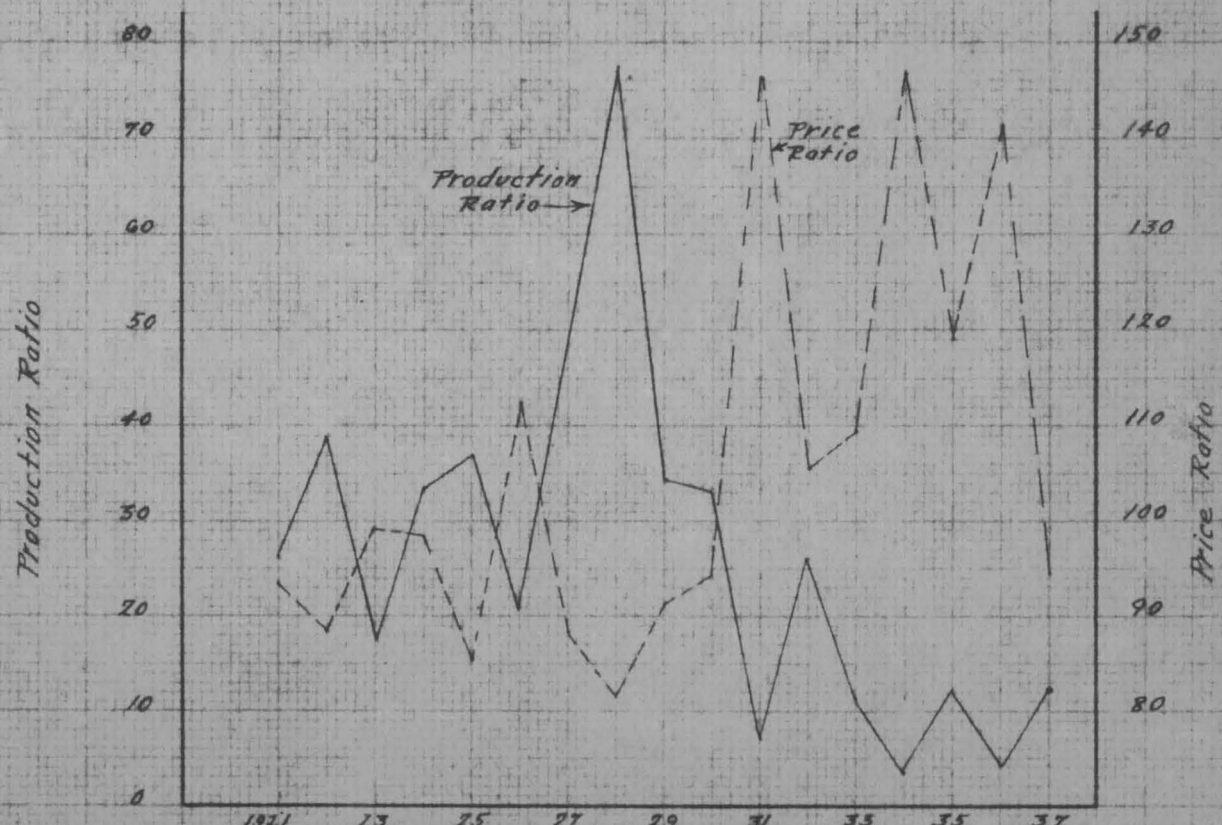


Fig. 30-Production and Price Ratios of Durum and Soft Red Winter Wheats, 1921-1937

winter the price of soft red winter had increased.

In 1928 the production ratio was extremely low due to a large production of hard red winter and a short crop of soft red winter. The price ratio in this year was relatively large showing that the price of soft red winter was high relative to hard red winter.

Figure 30 shows the production and price ratios of durum to soft red winter. An inverse relationship was found. In 1928 an exceptionally large production of durum and a short crop of soft red winter caused the production ratio for that year to be high. The price ratio was relatively low. Soft red winter was high in price relative to durum. Beginning in 1931 the production ratios of these two classes of wheat were low, due principally to short crops of durum. Soft red winter production during these years was lower in actual bushels, but the decline was not as great proportionally as for durum. The prices for these two classes show that relative to soft red winter, durum was high in price.

The production and price ratios of durum to hard red spring are shown in Figure 31. In 1921 and 1922 the production ratios were high. In these years the crop of durum was large while that of hard red spring was relatively small. The price ratios in these years were low, which indicated that relative to hard red spring prices the price of durum had advanced. Short crops of durum relative to those for hard red spring beginning in 1931 tended for durum prices to advance relative to those for hard red spring. In 1935 and 1937 production ratios increased and price ratios decreased, showing that hard red spring prices advanced relative to durum prices.

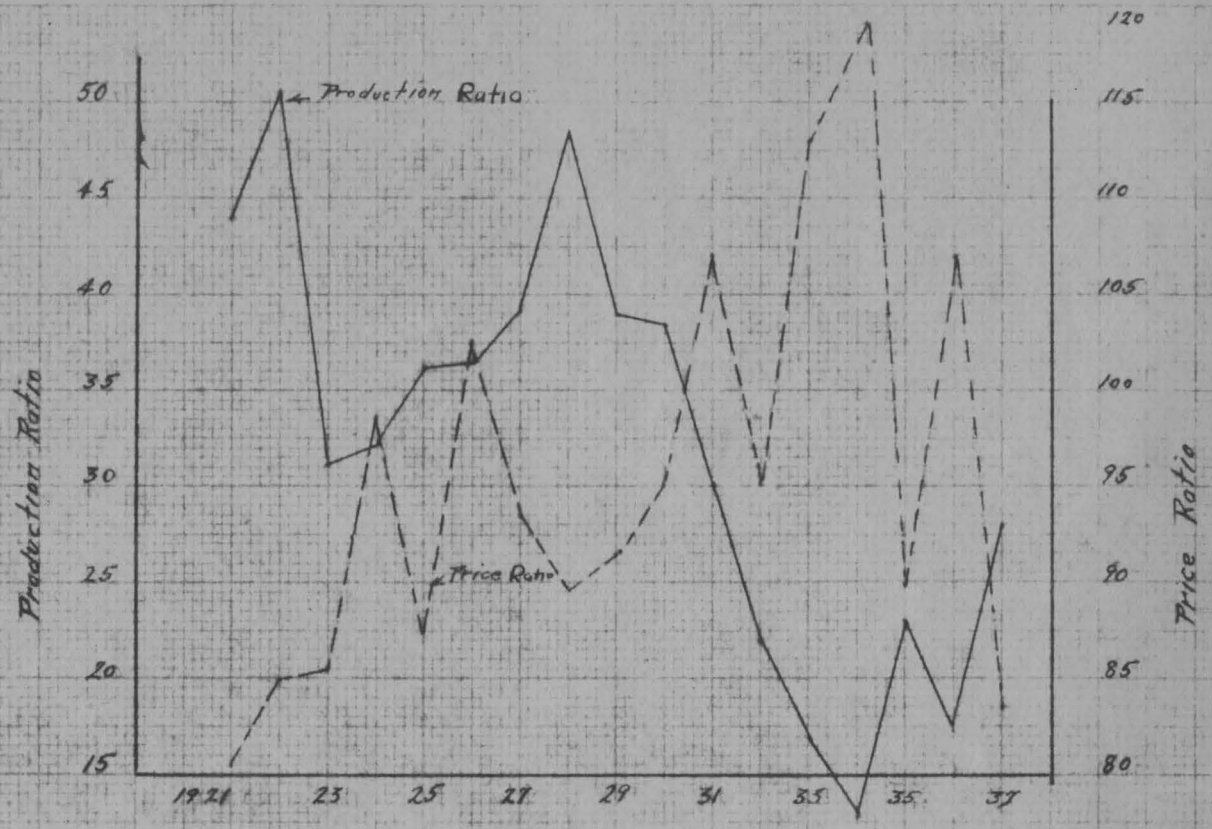


Fig.31.-Production and Price Ratios of Durum and Hard Red Spring Wheats,- 1921-1937

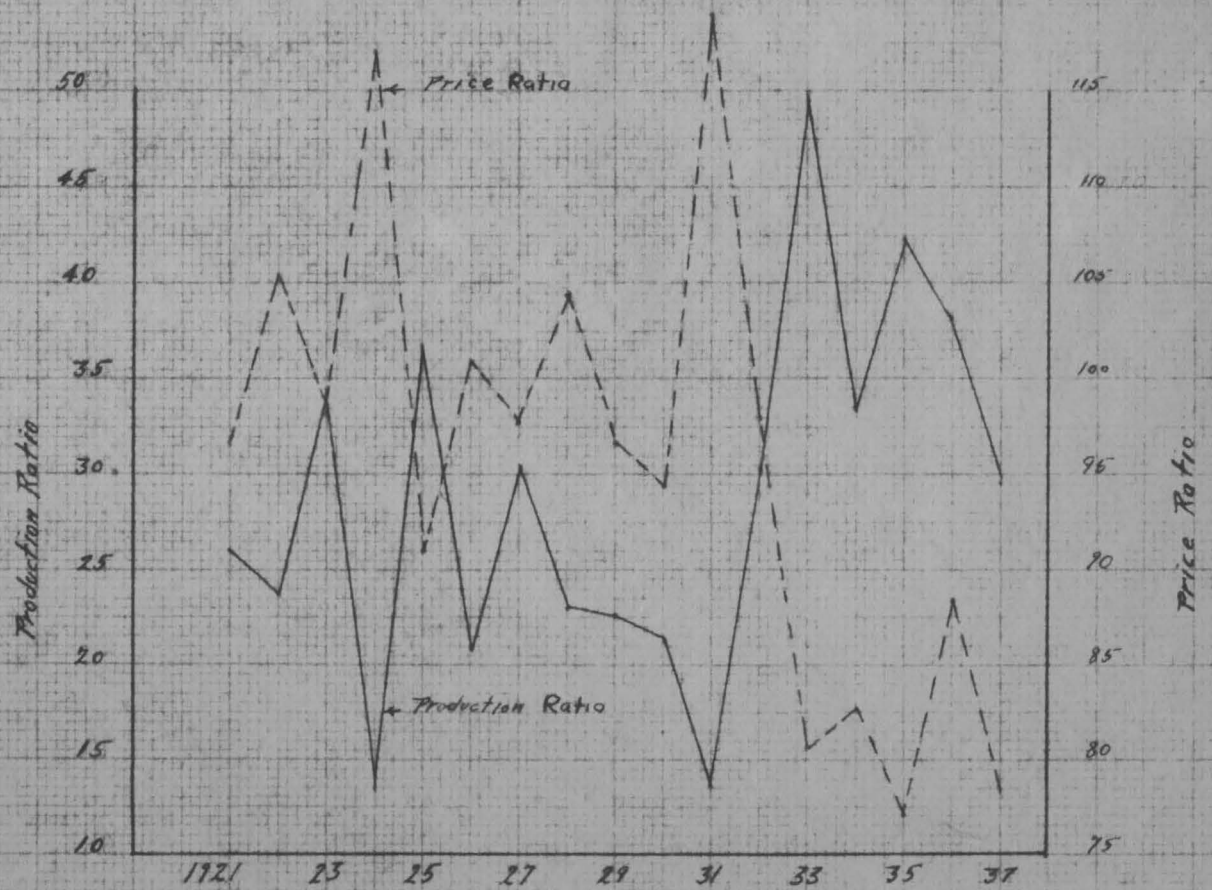


Fig.32.-Production and Price Ratios of White and Hard Red Winter Wheats, 1921-1937

In years when the production ratios and price ratios do not move inversely, other factors were probably responsible. Among these it may be that the carryover of each class of wheat has considerable influence. Changes in demand for the various classes may have some effect.

In 1924 the production ratio of white wheat to hard red winter was very low, and the price ratio was exceptionally high. (Figure 32). In this year the crop of white wheat was only 5.8 percent of the total United States production, while in the period 1921 to 1937 production of white averaged 11 percent. In the same year the production of hard red winter was 42 percent of the total United States production, while during the period 1921 to 1937 it averaged 40 percent. A similar situation occurred in 1931. In 1933, 1934 and 1935 the production ratios were high and the price ratios low. This condition tended to show that relative to hard red winter wheat production, the production percentage values for white wheat had increased and prices of white wheat had declined relative to those for hard red winter. During these years the spread between the production and price ratios was large.

Figure 33 shows the ratios of white to hard red spring. Between 1921 and 1930 the spread between the production ratios and price ratios was wide as compared to latter years, the price of white wheat during this period was high relative to hard red spring and the production of hard red spring was large relative to white. Beginning

in 1931 the production percentage values of white wheat increased relative to that for hard red spring and the price ratios decreased, showing that white declined in price relative to hard red spring. 1/ Other factors besides production influenced the relation between prices of the various classes and caused a small increase in the price ratio of white to hard red spring in 1936, when the production ratio increased tremendously.

During the period 1921 to 1937 the production percentage values of white wheat increased relative to the percentage values for durum wheat. The price ratio of durum to white increased, which indicated that relative to white wheat, the production of durum had decreased and its price had increased. From 1921 to 1930 the production ratio of durum to white wheat was above the price ratio, while in the period 1931 to 1937 the production ratio was below the price ratio. When compared to their relation over the entire 17 years, white wheat was high relative to durum in the first period and in the latter period durum had increased relative to white wheat. Short crops of durum relative to white increased the price of durum more than white after 1929. (Figure 34).

The production and price ratios of hard red spring to hard red winter wheat are shown in Figure 35. In 1925 a decrease in the production percentage value of hard red winter with an increase in the

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1/ Production percentage values refer to the percent that the production of a particular class of wheat is of the total United States production.

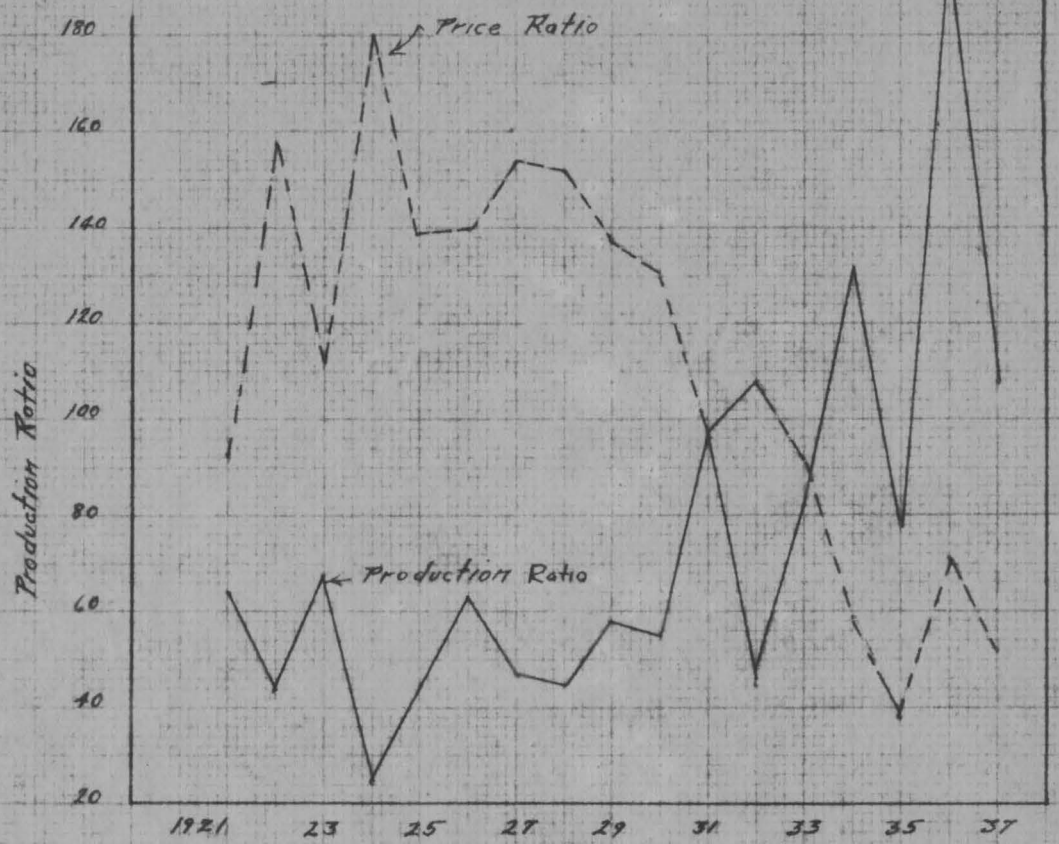

Fig.33-Production and Price Ratios of White and Hard Red Spring Wheats, 1921-1937

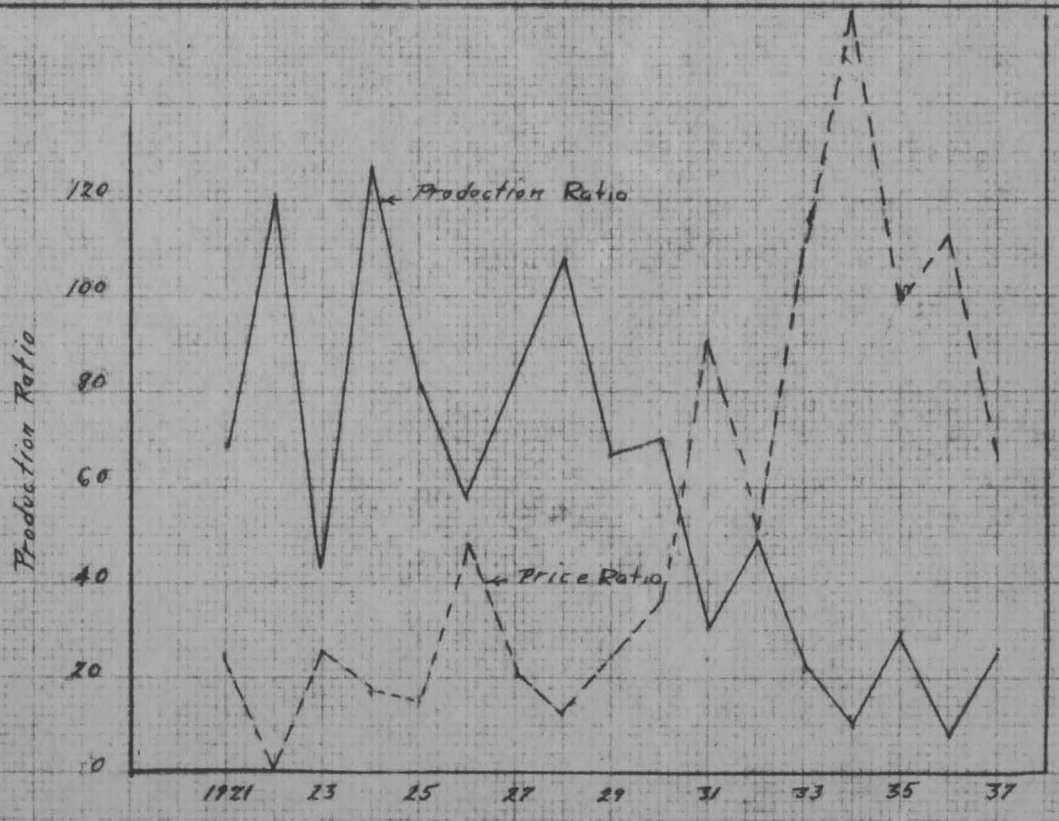

Fig.34.-Production and Price Ratios of Durum and White Wheats, 1921-1937

production value of hard red spring resulted in a large production ratio. The price ratio declined but not in proportion to the increase in the production ratio. With certain exceptions, there seemed to be a tendency for the price ratio to change less than the production ratio. In 1931 the production of hard red spring was small, only 73 million bushels,as compared to an average of 169 million bushels for the period 1925 to 1929. The production of hard red winter in 1931 was 514 million bushels, as compared to an average production of 332 million bushels for the years 1925 to 1929. The low production of hard red spring and the large production of hard red winter resulted in a low production ratio. The price ratio was high and tended to show that relative to the price of hard red winter hard red spring had increased.

The production ratio of white to soft red winter wheat has varied less in the last 17 years than the ratio of hard red spring to hard red winter. (Figure 36) In 1928 a reduced production percentage value for soft red winter with about an average production value for white resulted in a high production ratio. A decline in the price ratio occurred, showing that soft red winter had increased in price relative to white. In 1931 a fall in the production ratio tended for an increase in the price ratio, although there was a greater proportionate change in the price ratio than the production ratio. It is probable that factors other than production are responsible for this.

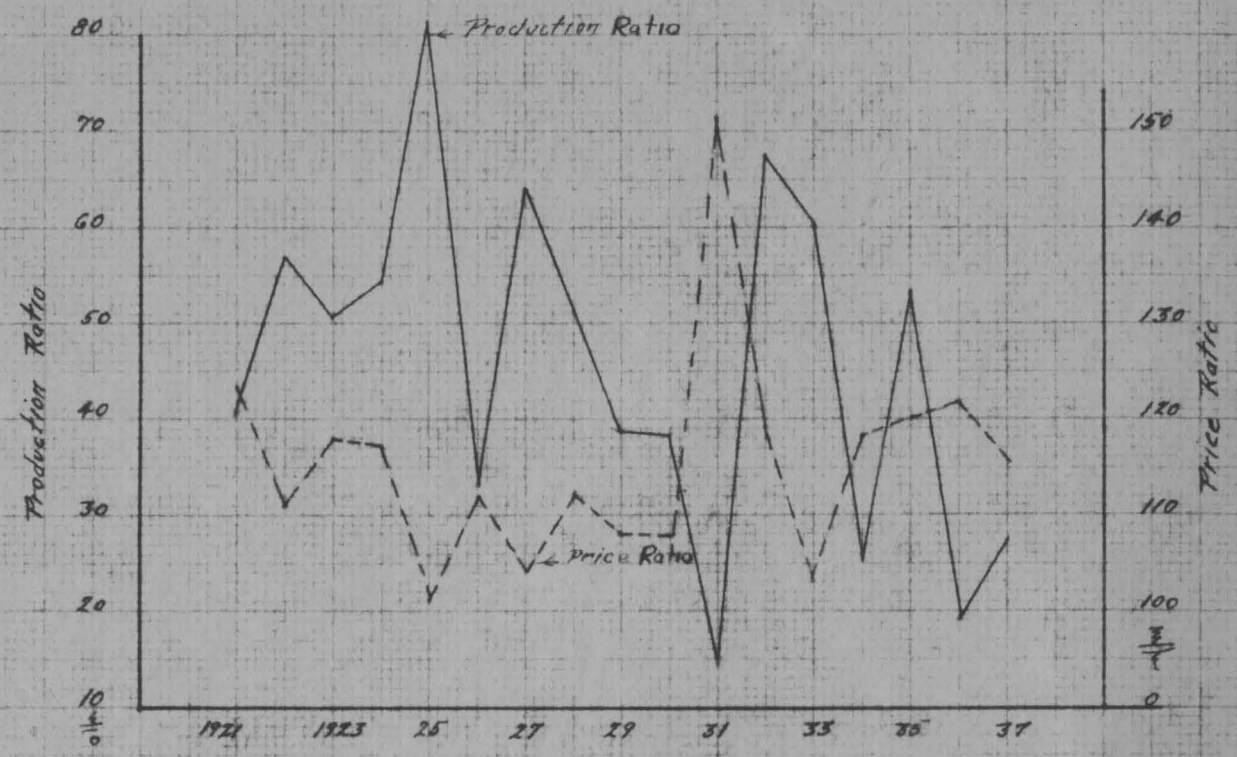

Fig. 35.-Production and Price Ratios of Hard Red Spring and Hard Red Winter Wheats. [1921 - 1937]

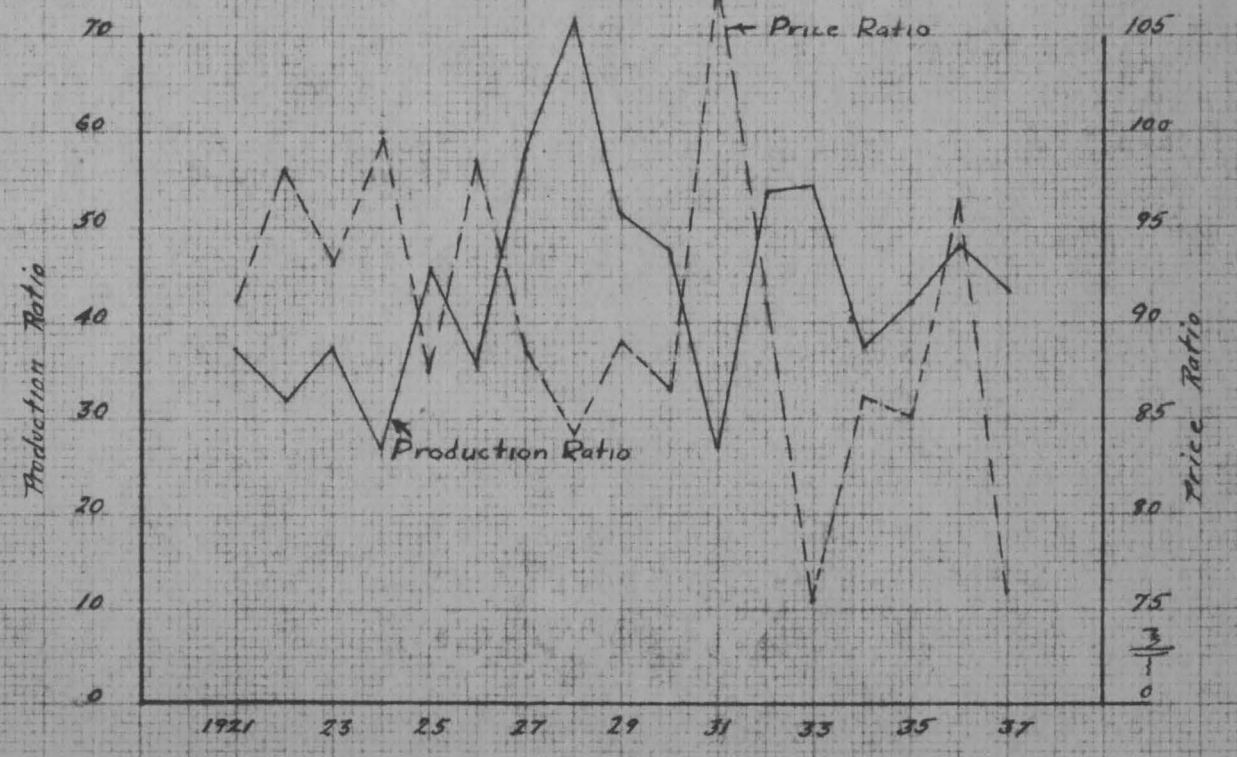

Fig. 36.-Production and Price Ratios of White and Soft Red Winter Wheats, 1921-1937

From 1921 to 1926 the production and price ratios of hard red spring to soft red winter were less variable than in the remainder of the 17 year period. (Figure 37). In 1928 a short crop of soft red winter tended to increase the production ratio considerably. Although the price ratio declined, it fell proportionally less than the increase in the production ratio. Short crops of hard red spring from 1934 to 1937 resulted in low production ratios. During this period the price ratios increased.

Figure 38 shows the production and price ratios of durum to hard red winter wheat. Over the past 17 years the production ratios of these two classes of wheat have taken a downward trend, which tends to show that relative to the production of hard red winter the production of durum has been declining. In the meantime the price ratios of durum to hard red winter have shown a tendency to increase, indicating that relative to the price of hard red winter, the price of durum has increased. The production and price ratios were quite variable from year to year, although the trends were evident.

Very little work has been done in the past on price differentials as pertaining to the various classes of wheat. The inadequate attempt to explain price differences by the use of production data, will show the occurrence of price differences and a need for studying this type of price behavior.

If significant results are to be obtained, it is probable that it would be necessary to prepare weighted prices to represent each class. Each grade within the class could probably be weighted by the

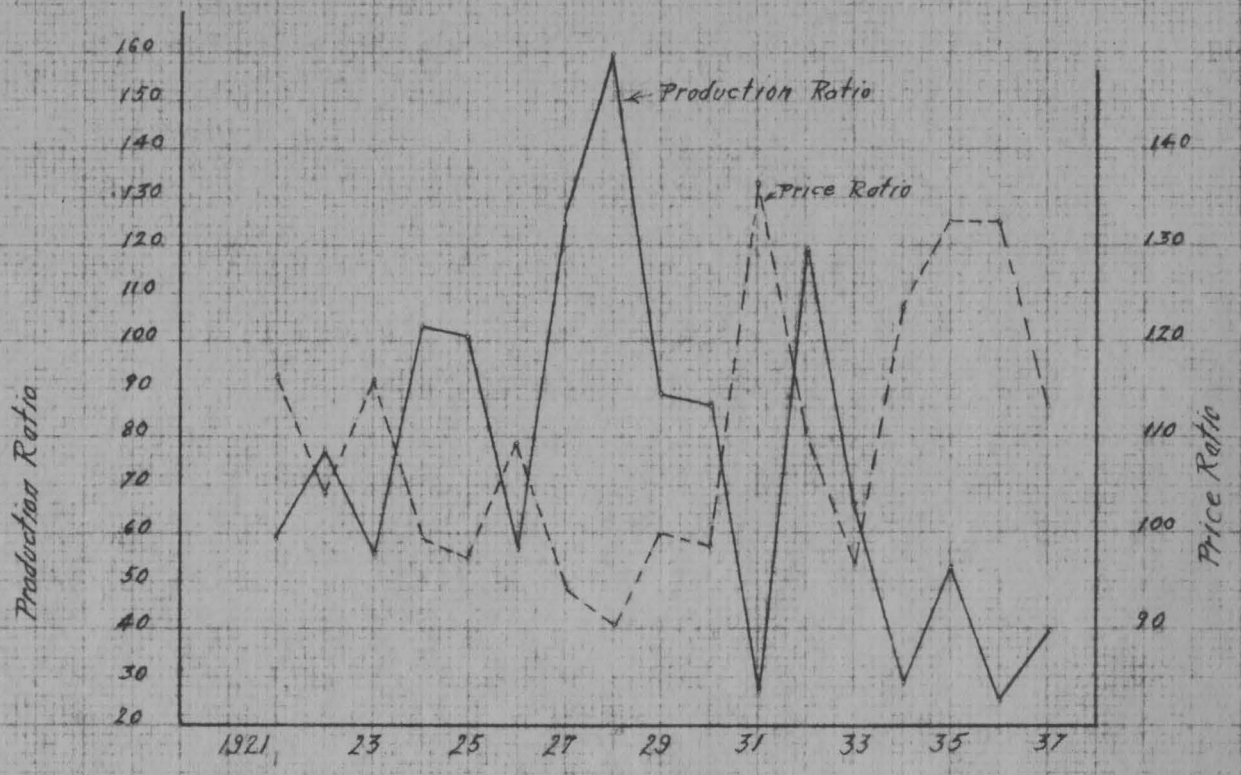

Fig. 37.-Production and Price Ratios of Hard Red Spring to Soft Red Winter Wheats, 1921-1937

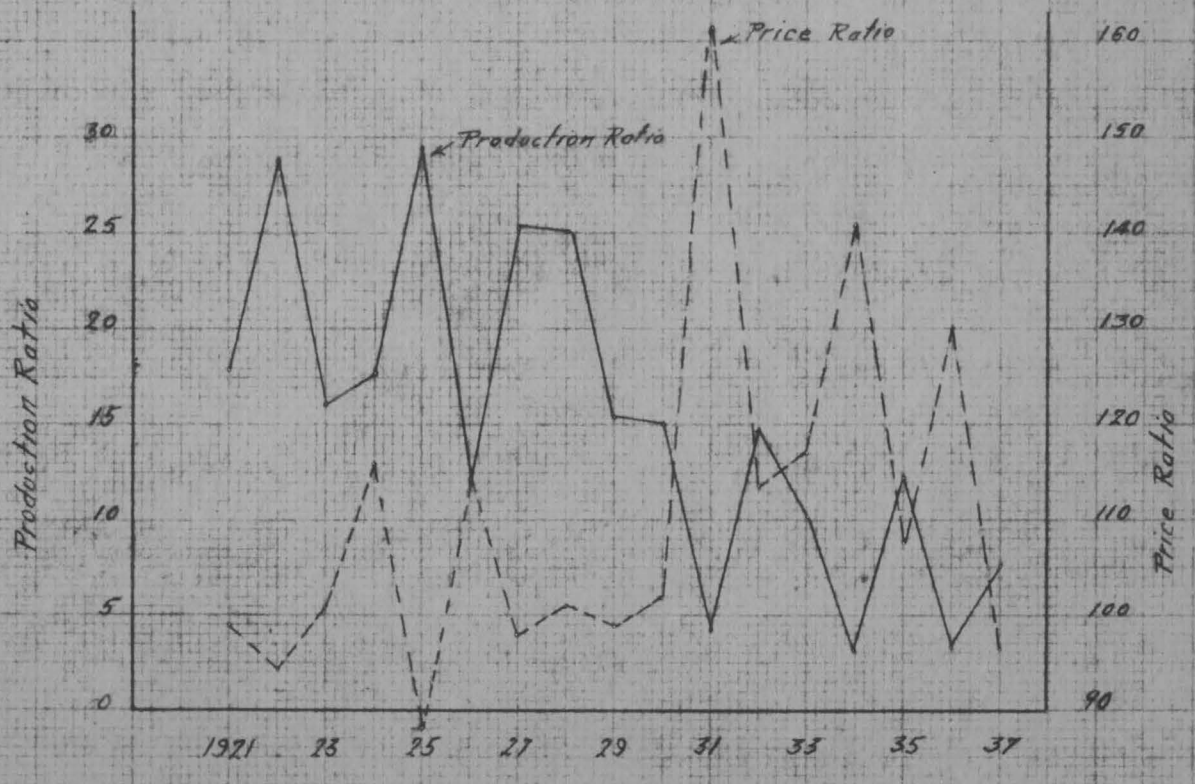

Fig. 38.-Production and Price Ratios of Durum to Hard Red Winter Wheats, 1921-1937

amount sold at the representative terminal markets.

If intra-class price analysis (price differences between grades within the class) is to be attempted, it is possible that sufficient price data are now available, at least for certain classes.

SEASONAL VARIATION IN WHEAT PRICES

One of the simplest methods of attempting to show seasonality in prices is to tabulate in graphic form the number of times monthly high prices were higher or lower than the preceding month. 1/

Figure 39 shows the results of this method when applied to No. 1 Northern Spring wheat at Minneapolis for the 52 year period 1886 to 1937. The primary data upon which the graph is based were taken from the 1937 Annual Report of the Minneapolis Chamber of Commerce for the year ending December 31, 1937.

In 28 years out of the 52,monthly high prices in July were lower than in the preceding June, while in 24 years prices were higher in July than in June. In this month new crop marketings begin to arrive on the Minneapolis market, but it is probable that the prospects and estimates of the spring wheat crop in the United States are an important factor in depressing prices in this month, especially if the outlook is for a large crop. Although some new wheat arrives at this market in July, the larger portion usually does not move until August and September. Spring wheat prospects in Canada are usually price influencing factors at that time. In July the marketing of wheat in the winter wheat belt is heavy and prices at Minneapolis are influenced by this condition, although probably not as much as Kansas City prices.

1/ See Green, R. M., Seasonal Fluctuations in Wheat Prices, Circular 121, Kansas State Agricultural Experiment Station, December, 1925.

In August Minneapolis prices during the 52 years were higher than the preceding month in 19 years and lower in 32 years. Prices in this month probably feel the complete affect of the movement of wheat in the winter wheat belt. Receipts at Minneapolis during this period are usually heavy and crop prospects in Canada no doubt influence prices to some extent. Harvest is usually at its peak in the spring wheat belt of the United States. In August there seems to be a decided decrease in the frequency of price improvement.

September prices increased less frequently than August prices. In the 52 year period the September price was higher than the August price in only 17 years, while in 35 years the price in that month was lower. The marketing of spring wheat is heavy in September, although there is a decided decrease in the marketing of wheat by farmers in the winter wheat belt. During that period harvesting is underway in the Canadian spring belt but it is still too early for a heavy movement to market. Exports of wheat from competing countries are usually light during this time, which may have a tendency to strengthen prices.

In October there seems to be a slight tendency for prices to increase more often than in September. In this month prices were higher 40 percent of the time against almost 33 percent of the time in September. In October monthly high prices were higher than the preceding month in 21 of the 52 years and lower in 28 years. Of the factors tending to depress prices in October, heavy marketings at Minneapolis and increased movement of the Canadian crop are

probably important. Prices in this month may tend to rise due to a decrease in receipts at other terminal markets, especially in the soft red winter and hard red winter wheat belts.

As compared to prices in the preceding month, November prices at Minneapolis declined in 35 out of 52 years and increased in 17 years. The tendency for weaker prices in this period may be due in a large measure to the heavy movement of Canadian wheat. Minneapolis receipts are usually smaller in this month than in any of the preceding three months, but usually larger than in any of the other months with this exception.

December prices show a tendency to strengthen. In the 52 years, the monthly high price of No. 1 Northern Spring at Minneapolis was higher than in the preceding month in 26 years and lower in 25 years. In the later part of December the Great Lakes are usually frozen over and closed to transportation. This reduces the movement of wheat from Canada. Another factor which may tend for stronger prices is the reduction in the primary movement of wheat to terminal markets in the United States.

January prices show a distinct tendency to increase over December prices. Prices in this month were higher than those in the preceding month in 40 of the 52 years, while they were lower in only 11 years. During this month the movement of wheat from Canada is reduced and exports from competing countries are usually the lowest. Although the harvests in Australia and Argentina are underway, movement of the crop into export channels is still very light. Wheat movement to

terminals in the United States is relatively small. In this month there is usually quite a drop in the quantity of wheat in store in public and private elevators at Minneapolis. The visible supply of United States wheat is usually smaller in January than in previous months, although the Canadian supply is usually larger.

Minneapolis prices show a tendency to weaken in February. In this month, prices were lower in 31 years and higher in 18. (Figure 39) Exports from the Southern Hemisphere are usually large in his month. Australia and Argentina export a large portion of their crop and these increased exports tend to depress world prices, which are reflected in our domestic markets. Sometimes local factors tending to strengthen prices may dominate those of world importance and cause prices to advance.

March prices show tendencies somewhat similar to those of February. In 30 of the 52 years prices in this month decreased as compared to those in February, while in 18 years prices advanced. Exports from Australia and Argentina continue to be large. Foreign demand for domestic wheat is usually reduced at this time, and will tend to weaken any price increasing influences which may be at work, especially if the crop in the Southern Hemisphere is large.

Prices in April tended to show an improvement over those in March. In 32 of the 52 years prices advanced over those in March and decreased in 19 years. In this month exports of wheat from the Southern Hemisphere are usually decreasing. The Great Lakes are still closed to transportation and there is no great increase as yet in the

spring movement of wheat from Canada. Available estimates of condition of the winter wheat crop and prospective planting of spring wheat are often price influencing factors at this time.

The May price at Minneapolis increased over the preceding month in 29 of the 52 years and decreased in 22 years. Although export movement in Argentina and Australia is usually lighter in this month, Canadian movement increases. The Great Lakes are usually open for transportation by the end of April. It is possible that if the Canadian crop in the preceding fall was large, the movement in the spring would be important. Spring and winter wheat prospects may at times influence prices in this month. The acreage of wheat seeded and growing conditions usually influence cash grain prices through the futures market.

June prices show a tendency to decline as compared to the previous month. The price in June decreased in 31 out of the 52 years and increased in 20 years. Harvest in the winter wheat belt usually begins in this month and movement from farm to market proceeds. Minneapolis prices are influenced by these conditions through the movement of prices at Kansas City. It is probable that price influencing conditions concentrated in the winter wheat belt seldom affect prices at Minneapolis and without affecting prices at Kansas City. The influence at Kansas City is probably more direct than the affect at Minneapolis. Spring wheat prospects in Canada and the United States no doubt tend to influence prices in this month. In some years, through its influence on export demand, European production may tend to influence prices,

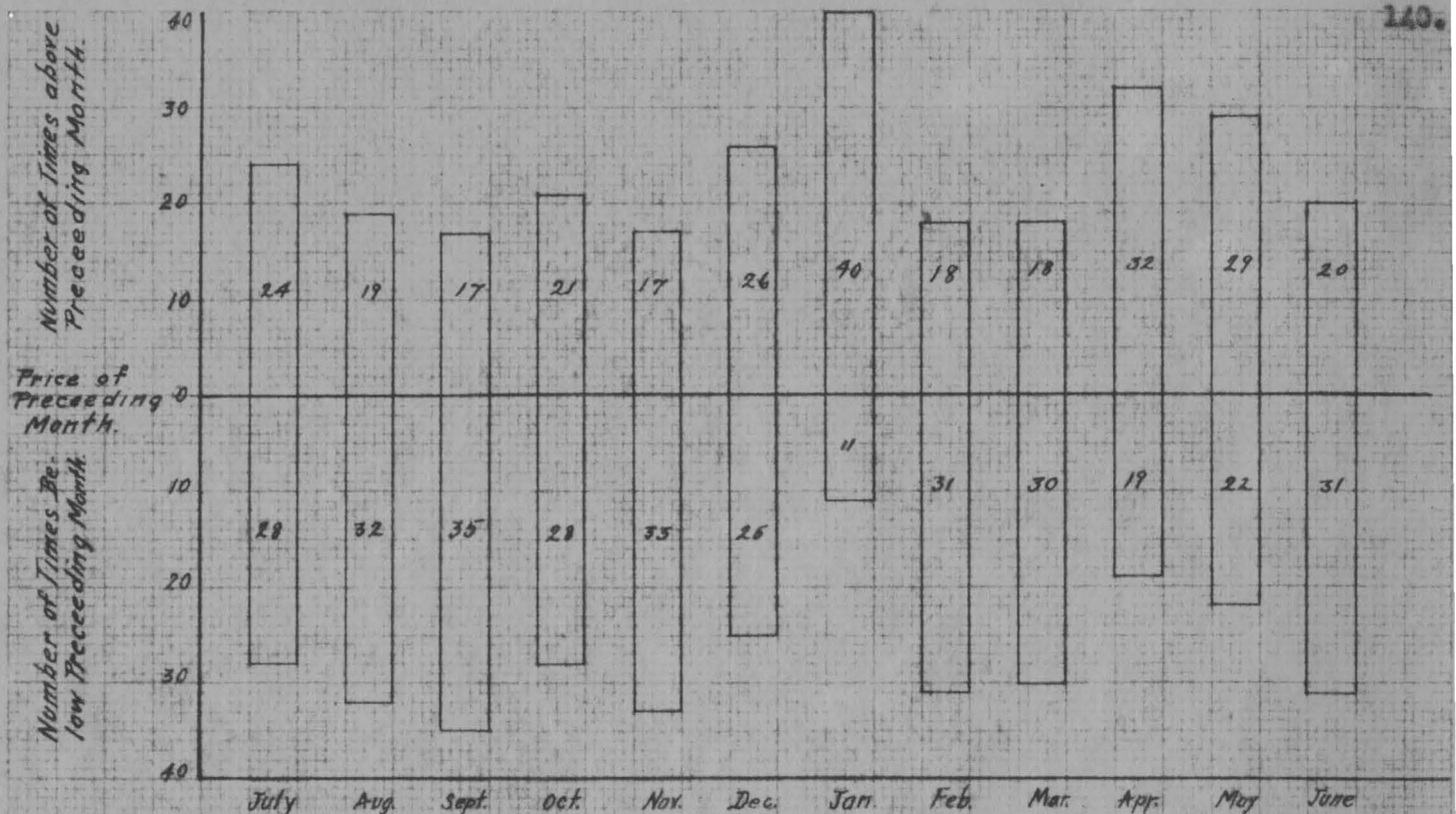

Fig. 39 - Number of Times Monthly High Prices of No. 1 Northern Spring of Minneapolis Were Higher or Lower than for the Preceeding Month for 52 Years. 1886 - 1937

Note: Raw data from 1937 Annual Report of Minneapolis Chamber of Commerce

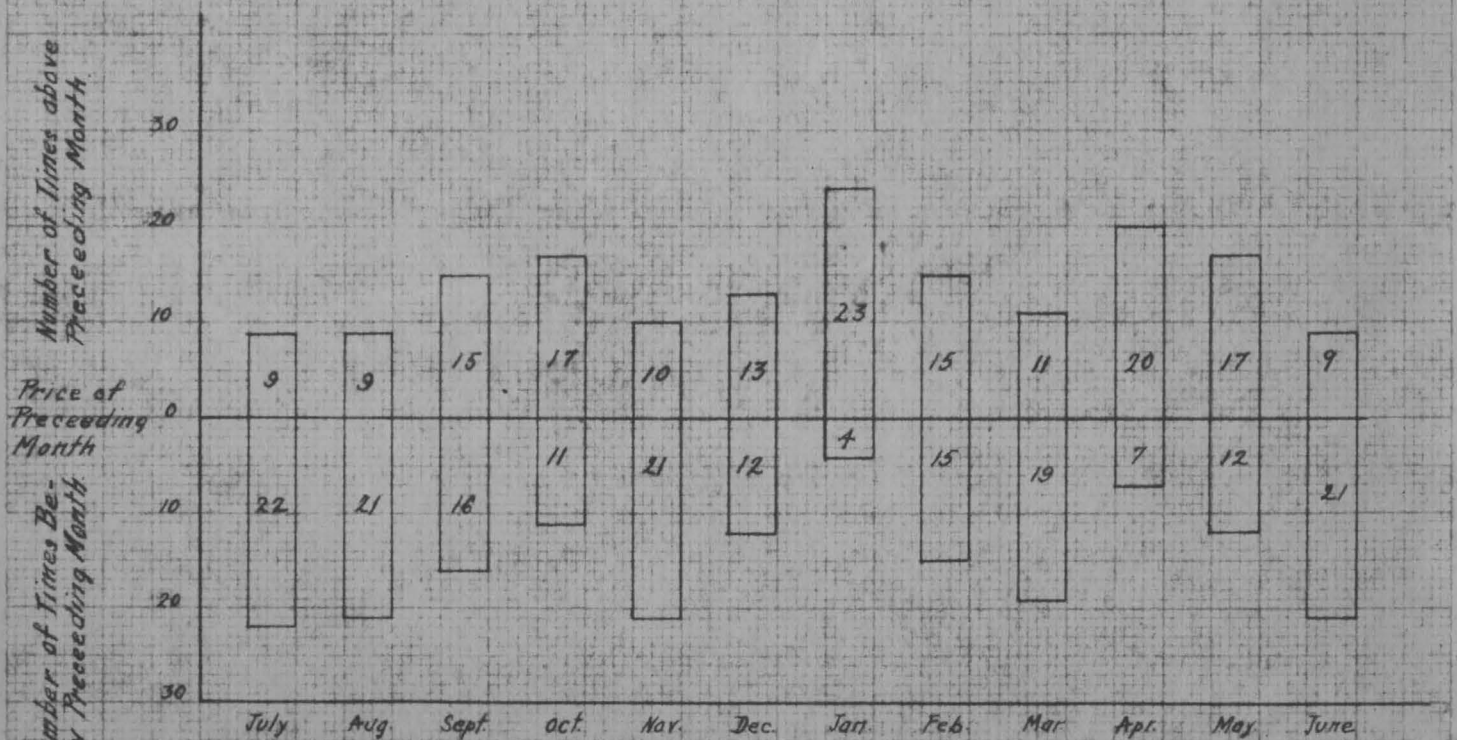

Fig. 40 - Number of Times Monthly High Prices of No. 2 Hard Winter Wheat at Kansas City during the Month were Higher or Lower than for the Preceeding Month for 32 Years, 1892-93 to 1923-24

Secondary Source: Green, R.M., "Seasonal Fluctuation of Wheat Prices," Circular 121 Dec. 1925 Kansas State Agricultural Experiment Station.

particularly in the exporting countries.

Figure 40 shows data similar to that in Figure 39, although for No. 2 Hard Winter wheat at Kansas City. The material was prepared by Professor R. M. Green and taken from his bulletin "Seasonal Fluctuations of Wheat Prices". 1/ With the exception of the tendencies in the months of August and September, the prices at Minneapolis displayed seasonality similar to prices at Kansas City.

New wheat arrives in the Kansas City market before it does in the Minneapolis market. Winter wheat marketing usually begins at least a month before the marketing of spring wheat. The large movement of wheat in the winter wheat belt in the early portion of the crop year tends to depress prices at Kansas City directly and indirectly those at Minneapolis. As the crop year proceeds into September, October and November, prices at Kansas City are probably influenced less by new crop supplies in the winter wheat belt than Minneapolis prices are by new crop marketings in the spring belt. During the months of heavy spring wheat movement, prices at Minneapolis are influenced more directly by this factor than are prices at Kansas City. It is also probable that Minneapolis prices are influenced more directly by Canadian crop conditions.

The second method employed to measure seasonality is that of indexes of seasonal variation.

1/ Green, R. M., Seasonal Fluctuations of Wheat Prices, Circular 121, Kansas State Agricultural Experiment Station, December, 1925.

Monthly weighted average cash prices of No. 2 Hard Winter wheat at Kansas City were used for this purpose. Each monthly price was divided by the corresponding monthly index number of the prices of all-commodities in an attempt to "eliminate" the affect of changes in the value of money. 1/

In calculating the indexes of seasonal variation the method of ratio to trend was followed. To obtain the index for January the following operations were performed. Trend was represented by a 13 month moving average determined by adding to the sum of the July to June purchasing power values the sum of the succeeding August to July values and dividing the total by 24. The result, a 13 month moving average, was centered on the seventh month, January in this instance. A similar procedure was used to obtain trend values for all months from January 1921 to December 1937. The next step was to obtain ratios of actual monthly purchasing power values to the corresponding trend values. For January the ratios were found by dividing each monthly actual purchasing power value by the corresponding monthly trend values. The ratios so obtained for all Januarys in the 17 year period were then averaged. The resulting value was the unadjusted index of seasonal variation for January. After these calculations were completed for all 12 months, the indexes were adjusted to total 1200. (See Table 28 for the adjusted values).

1/ The Bureau of Labor Statistics index numbers of the prices of all commodities converted to a 1910-194 base were used for this purpose.

Professors Waite and Cox at the University of Minnesota prepared indexes of seasonal variation of the price of No. 2 Hard Winter wheat at Kansas City using actual prices rather than purchasing power. 1/ The writer followed the same procedure in calculating the indexes based upon purchasing power that the above investigators used in determining seasonal variation using actual prices. With this exception and the fact that the indexes based upon actual prices covered the years 1921 to 1935 while those based upon purchasing power included two additional years, 1921 to 1937, the two are comparable. 2/

As may be seen in Figure 41, the two correspond rather closely. With the exception of May, the two moved in the same direction in every month. In May the index based upon purchasing power rose, while that based upon actual price fell.

Based upon the indexes of seasonal variation calculated from purchasing power, Kansas City prices tended to decline in July, increased in August, September, October, November, December, January, and February. A decline occurred in March, followed by an increase in April and May and a decline in June.

Figure 42 shows the index numbers of seasonality calculated by Professors Waite and Cox for No. 1 Northern Spring wheat at Minneapolis. According to their data, a continuous decline in prices tends to occur

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1/ Waite, Warren C. and Cox, Rex E., Seasonal Variations of Prices and Marketings of Minnesota Agricultural Products, 1921-1937, Bulletin 127, Minnesota Agricultural Experiment Station.

2/ Data taken from Minnesota Bulletin 127 are found in Table 28.

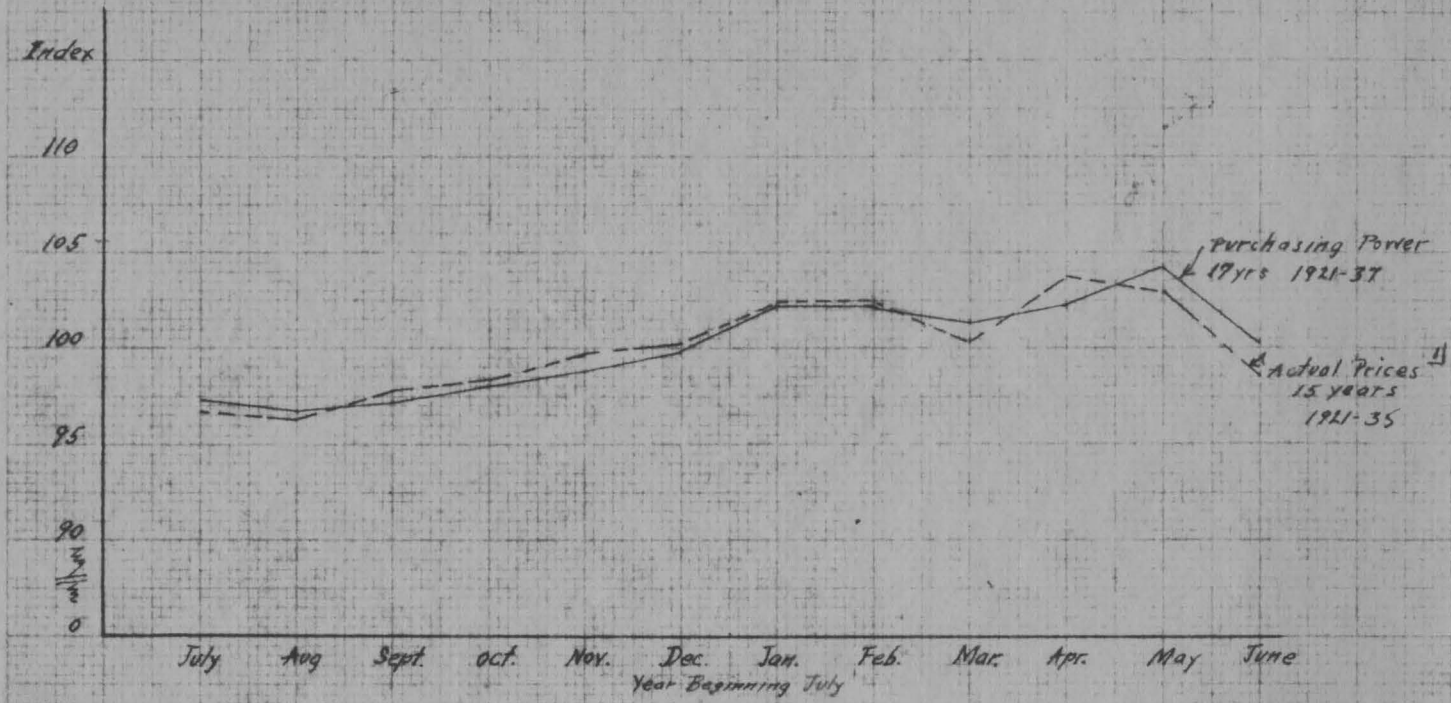

Fig 41. Index of Seasonal Variations of No. 2 Hard Winter Wheat at Kansas City in Actual Prices and and Purchasing Power, 1921-35 and 1921-37 1/ Data from. Waite, Warren C and Cox. Rex W., "Seasonal Variations of Prices and Marketings of Minnesota Agricultural Production 1921-35." Bulletin 127. Minnesota Experimental Station.

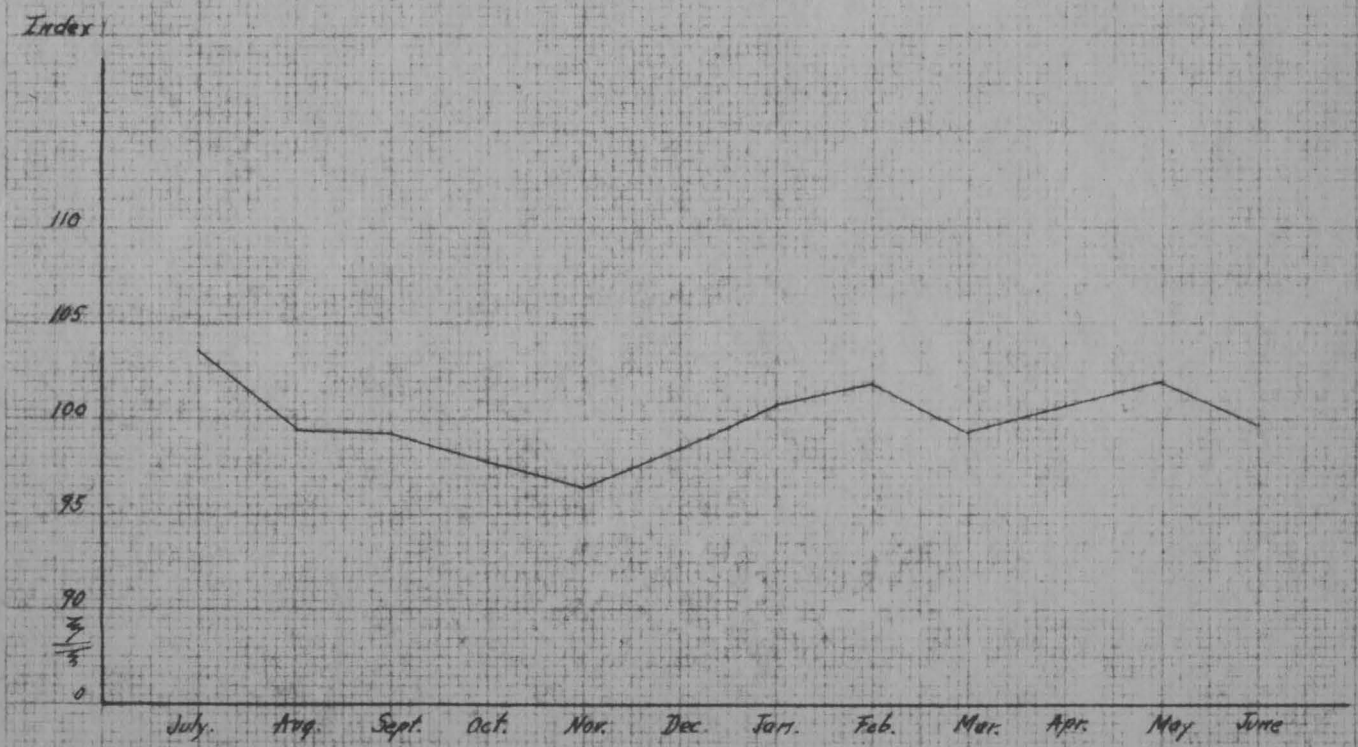

Fig. A2. Index of Seasonal Variation No. 1 Northern Spring at Minneapolis in Actual Prices 1921-35 Data from Waite and Cox, "Seasonal Variations of Prices and Marketings of Minnesota Agricultural Production 1921-35" Bulletin 127 Minn Exp. Station.

beginning in May and ending in November. As was stated in connection with Figures 39 and 40, increased supplies of spring wheat on the Minneapolis market tend to depress prices in August, September and November. Prices in the months of June and July are probably weakened by heavy marketings of winter wheat at Kansas City and spring wheat prospects in the United States and Canada. After November the tendencies for seasonal variation are similar at both markets. June prices fall faster at Kansas City than at Minneapolis, probably due to the harvest and prospects for a crop in the winter wheat belt.

It is probable that regular, re-occurring seasonal variation in wheat prices is limited to a rather small amount and is dominated in most years by cyclical influences which vary in magnitude and time of appearance. 1/

1/ See Minnesota Agricultural Experiment Station Bulletin No. 127.

PRICES OF WHEAT PRODUCTS

Index numbers were prepared for the Minneapolis wholesale prices of No. 1 Northern Spring wheat, Spring Patent flour, Standard middlings, Standard bran and the Minneapolis retail price of white bread by months for the crop years 1920 to 1937.

The original prices in actual units are found in Tables 29, 30, 31, 32 and 33.

The same method was used in arriving at the index numbers as has been described in the preparation of index numbers of the price of wheat in five countries. Averages of the five monthly prices for each month during the period January 1910 to December 1914 were used as a base. The base price for each month was divided into the corresponding monthly price for each crop year from 1920 to 1937, with the exception of flour, for which the period ran from 1920 to December 1937. In the calculation of the index numbers for the retail price of bread corresponding months for the period January 1913 to December 1914 were used, no data was available prior to that time. All prices used with the exception of those for retail bread were monthly averages. The prices quoted for bread are for the 15th of the month in most instances. The index numbers are found in Tables 34, 35, 36, 37 and 38.

Figure 43 was prepared to show the relation between the purchasing power of the price of Spring Patent flour at wholesale and the United States supply of all wheat. The supply-price curve was calculated by using the same procedure as outlined in connection with supply-price curves for wheat. The preceding five year moving average of purchasing

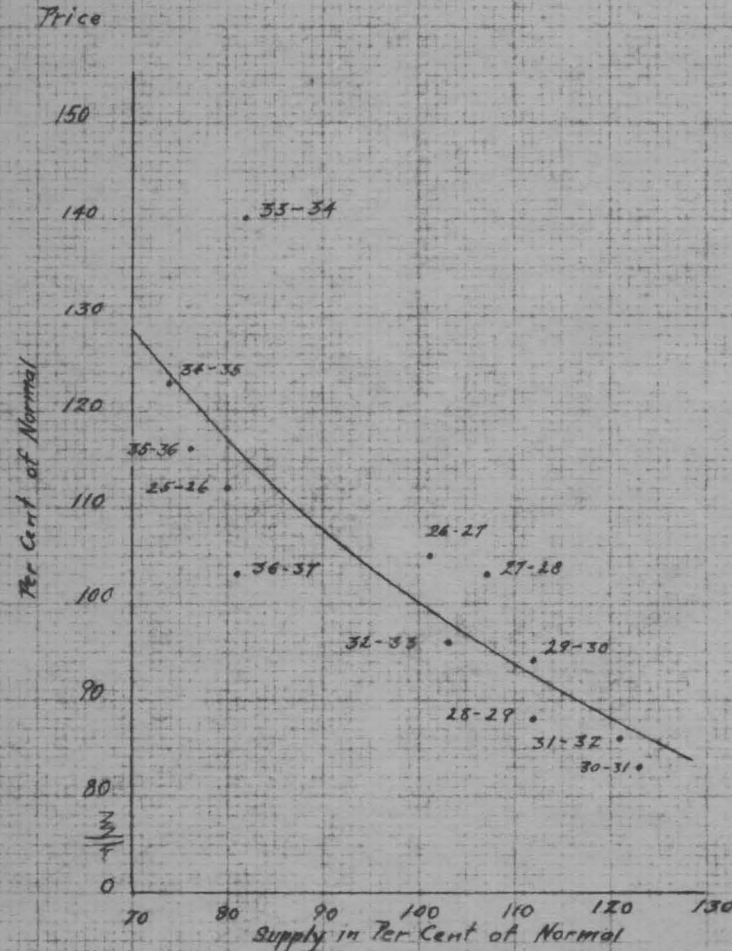

Fig. 43. The Relation of U.S. Supply of Wheat to the Purchasing power of Spring Patent Flour per Barrel at Minneapolis, 1925-26 to 1936-37.

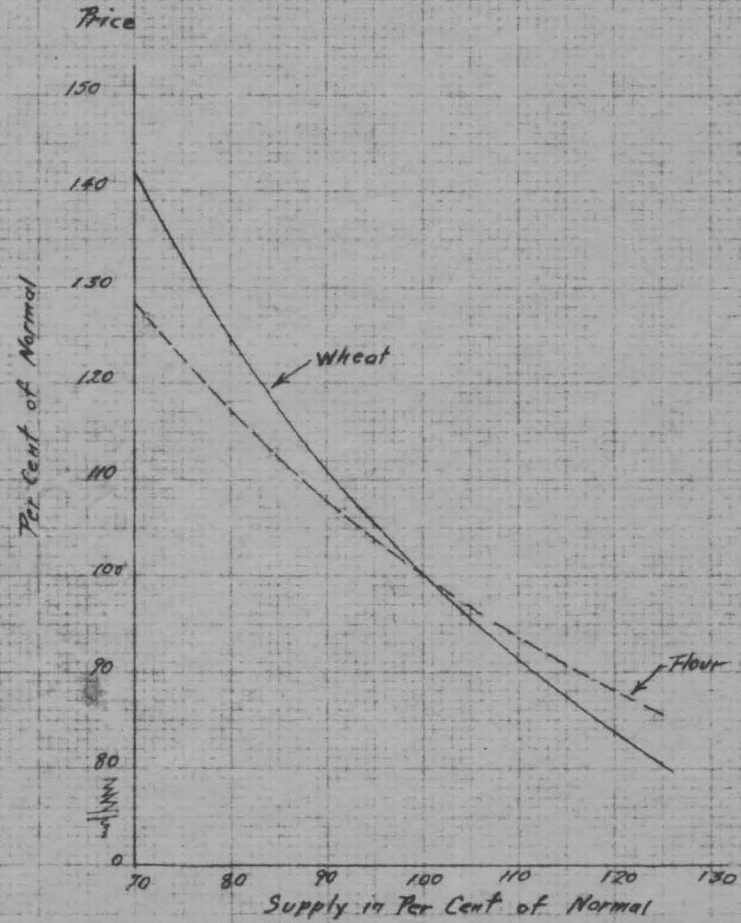

Fig. 44. The Relation of U.S. Supply of Wheat to the Purchasing Power of Spring Patent Flour per Barrel, 1925-26 to 1936-37, and of No. 1 Dark Northern Spring, 1925-26 to 1937-38, at Minneapolis.

power and supply was used as a "normal" for each. The price of spring patent flour was stated in terms of purchasing power by dividing price by the index numbers of the prices of all commodities. 1/ The period covered includes the crop years 1925 to 1936. The calculated price values obtained for various degrees of supply are given in Table 23. The original and revised equations are found in Table 24.

During the period covered when the United States supply of wheat was 20 percent below normal, the Minneapolis price in terms of purchasing power was 17 percent above normal. When the supply of wheat was 20 percent above normal the price of flour was 12 percent below normal. A short supply of wheat had a more striking influence on flour prices at Minneapolis than a large supply.

Figure 44 shows the relation of the United States total supply of wheat to the June price of No. 1 Dark Northern Spring wheat at Minneapolis and the July-June average price of Spring Patent flour at Minneapolis. Wheat prices cover the period 1925 to 1937 and flour prices are for the period 1925 to 1936. The two curves are not strictly comparable, but the writer doubts if the curve for wheat would have been changed appreciably if crop year average prices had been used instead of the June price and if the period covered had been 1925 to 1936 instead of 1925 to 1937.

There is a tendency for wheat prices to be influenced more by a given supply than are flour prices. Data presented later will further

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1/ Bureau of Labor Statistics index converted to a 1910-1914 base, and a crop year average.

substantiate this statement. It is logical to expect such a condition. For as a commodity passes through the channels of processing it is affected less and less by factors causing price changes in the raw material.

During the period when the United States supply of wheat was 20 percent above normal, the June price of No. 1 Dark Northern Spring was 16 percent below normal, while the crop year average price of Spring Patent flour was 12 percent below normal. When the United States supply of wheat was 20 percent below normal, the June price of wheat was 24 percent above normal and the crop year average price of flour was 17 percent above normal.

Index numbers of the wholesale price of No. 1 Northern Spring wheat, Spring Patent flour, and the retail price of bread at Minneapolis for the period 1923 to 1937 are shown in Figure 45. Prices of No. 1 Northern Spring wheat were not available for all months after 1934. As may be seen, the price of flour follows the price of wheat more closely than does the price of bread. From the crop year 1923 into a portion of 1924, the price of bread was considerably above the prices of flour and wheat, based upon the relation of wheat and flour prices in the period 1910-1914 and bread prices in the period 1913-1914. From 1924 to 1929 the prices of all three corresponded more closely to the relationship held during the base period than in any other portion of the 15 years. In all months during this period, the index numbers of the price of wheat were below those for flour and bread. Index numbers for flour fluctuated above and below bread.

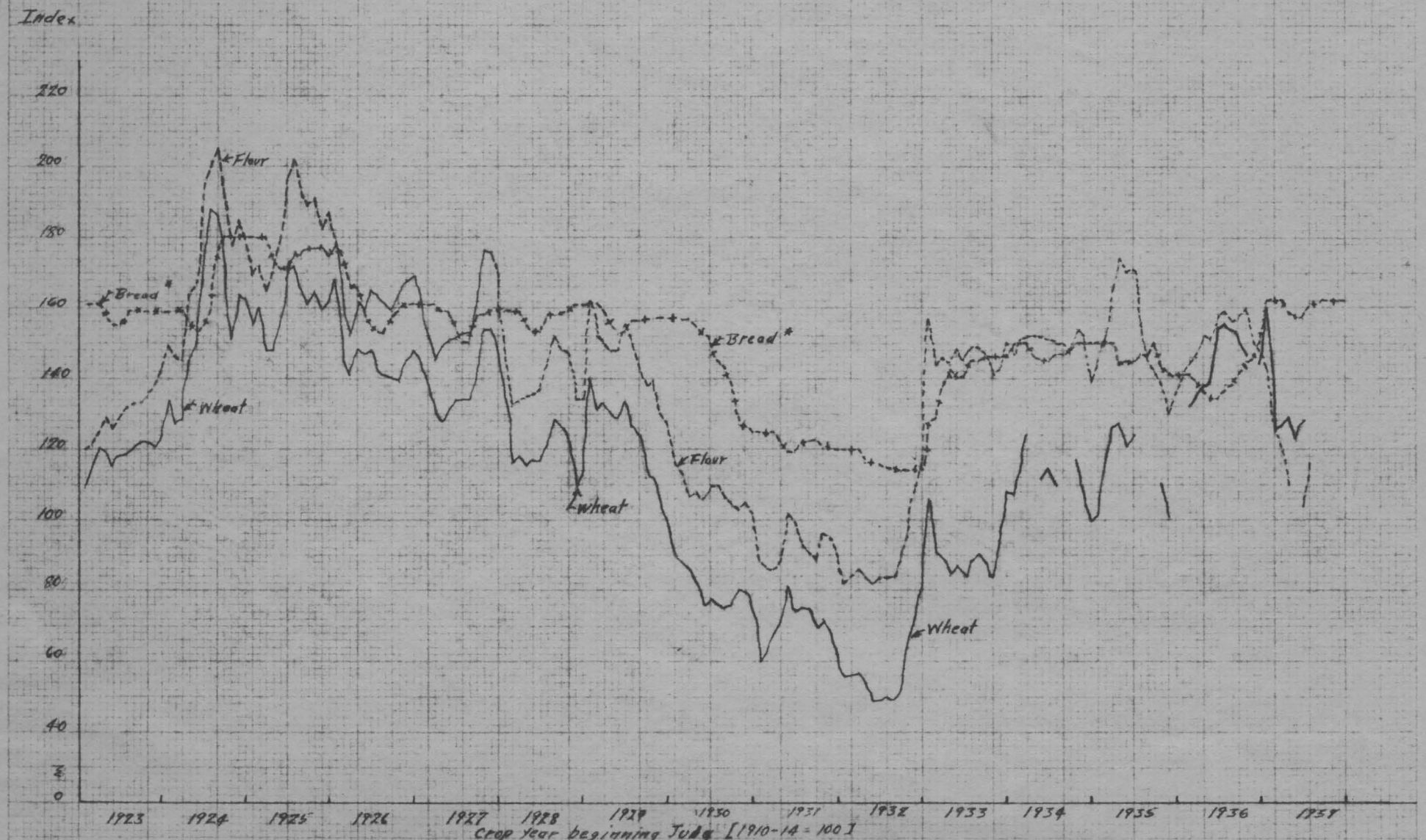

Fig. 45.-Index Numbers of the Wholesale Price of No. 1 Northern Spring Wheat, Spring Patent Flour, and Retail Price of Bread at Minneapolis, 1923-1937

* [1913-14=100]

Beginning with the rapid decline in price which started in the crop year 1929, wheat prices fell faster and further than either flour or bread prices. Based upon their 1910 to 1914 relationship, flour prices declined but were high relative to wheat prices. Bread prices continued their level which began in 1926 until the middle of the 1930 crop year, when a gradual decline started and continued until July, 1933.

In July, 1929 the index number of the price of No. 1 Northern Spring wheat was 140. In the same month the index of the price of Spring Patent flour stood at 162 and that of the retail price of bread 161. In December 1930 the price of wheat was 78, the price of flour 110 and the retail price of bread 152. The price of wheat had fallen 44 percent in the 17 months, the price of flour was down 32 percent and the retail price of bread fell 5½ percent.

When the price of wheat had reached a low point in December, 1932, the index numbers of prices were as follows: Wheat, 49; flour, 84; and bread, 116. From July, 1929 to December, 1932, wheat had declined 65 percent, flour 48 percent and bread 28 percent. During this period of rapid deflation wheat prices fell fastest, flour prices fell next and bread prices fell least of all. (Tables 34, 35 and 38).

When devaluation occurred in April, 1933, wheat and flour prices advanced but retail bread prices continued on their former level until July, 1933. From April to July wheat prices advanced 66 percent and flour prices 53 percent.

On July 9, 1933 the processing tax of 30 cents per bushel on the milling of wheat, as authorized under the Agricultural Adjustment Act,

became effective. From June to July of that year wheat prices advanced 32 percent, flour prices in the meanwhile had risen 36 percent and the retail price of bread over 11 percent.

From August, 1933 to July, 1935 prices of flour and bread remained practically stable. (Figure 45) In the meantime the price of wheat fluctuated from a low of 75 cents per bushel in April, 1934 to a high of 126 cents per bushel in July, 1935. 1/

After July,1936 and up until July, 1937, the prices of wheat, flour and bread were somewhat near the relation that existed during the base period. (1910-1914 in reference to wheat and flour and 1913-1914 in reference to bread). After July, 1937 a sudden decline occurred in the prices of wheat and flour, while the price of bread continued on its previous level.

Figure 45 shows some of the serious maladjustments and dis-eq uilibrium which occurs between prices of various commodities during periods of inflation and deflation. The price of raw material (wheat) moves fastest, while the prices of semi-processed or manufactured goods (flour) move less rapidly and the retail price of goods (bread) changes very little.

Index numbers of the prices of No. 1 Northern Spring wheat, Spring Patent flour, Standard bran, and Standard middlings are shown in Figure 46. This graph shows how prices of bran and middlings follow the price of wheat more closely than the price of flour.

1/ Based upon monthly highs and lows as obtained from the 1937 Annual Report of the Minneapolis Chamber of Commerce.

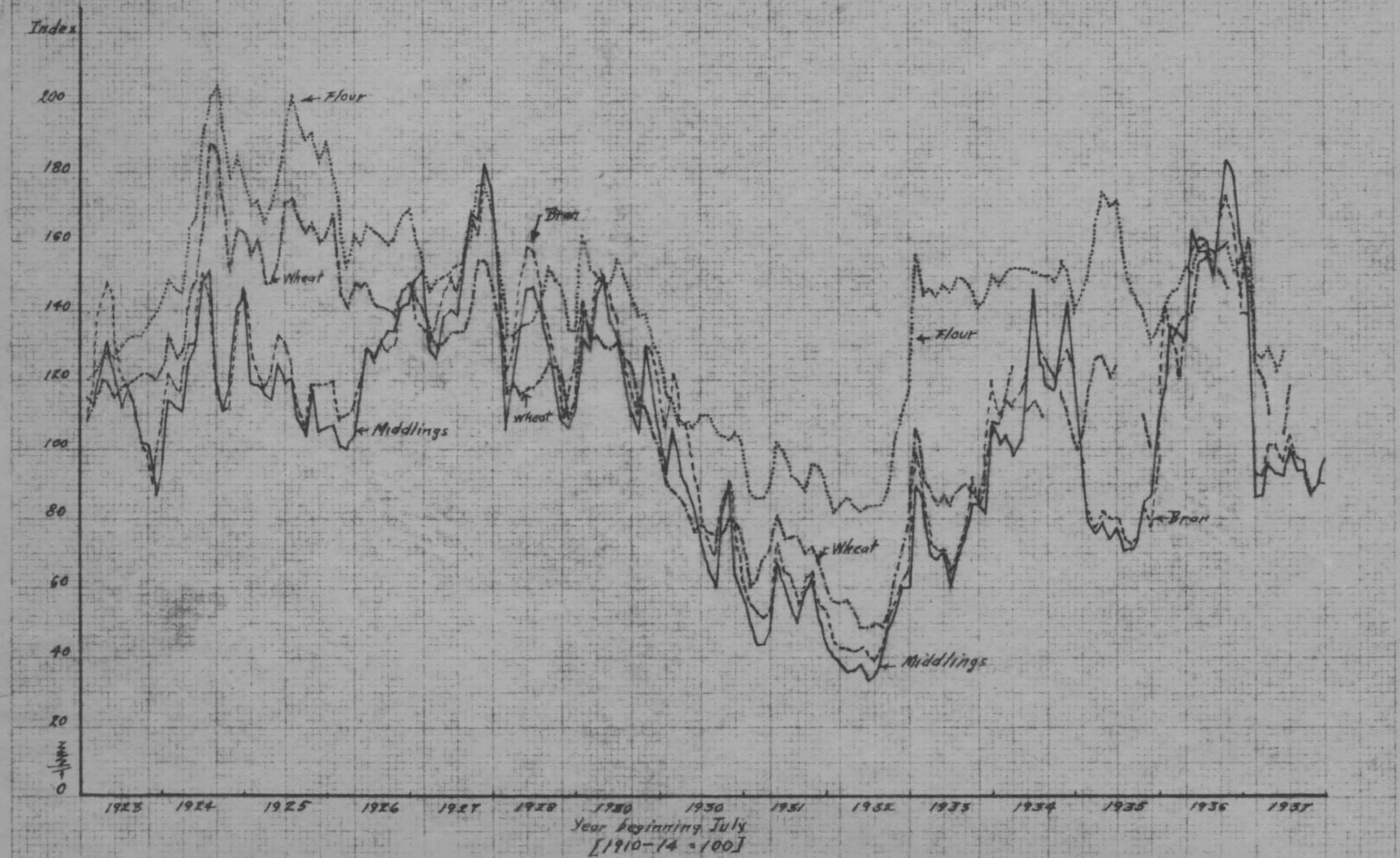

Fig 46.- Index Numbers of the Price of No. 1 Northern Spring Wheat and Spring Wheat Products, 1923-1937

Based on their 1910-1914 relationship prices of flour were high relative to wheat during most of the 1923 to 1937 period. From 1923 to 1926 flour prices followed the course of wheat prices more closely than did prices of either bran or middlings. Since bran and middlings are used principally as stock feeds, it seems logical to conclude that demand for these may cause more variation in price than in the case of flour.

During the period 1927 to 1929 and the greater portion of the 1936 crop year, the prices of wheat, flour, bran and middlings were somewhat nearer their 1910 to 1914 relationship. During the deflation era beginning late in the 1929 crop year, prices of all four commodities declined. From 1930 to 1935 flour prices were high relative to wheat prices. The prices of bran and middlings followed closely the downward course of wheat prices during most of the period. There seemed to be a slight tendency for wheat prices to fall faster than prices of bran and middlings from 1929 to 1930, but remained above the latter from 1931 to 1932. When prices advanced in the spring of 1933, wheat prices tended to rise faster than those of bran and middlings. After the prices of wheat and wheat products had assumed a relationship in 1936 somewhat nearer their relationship in 1910 to 1914, the rapid decline in prices in 1937 tended to cause a new dis-equilibrium. Prices of wheat, bran and middlings declined more than the price of flour. (Figure 46).

INTERNATIONAL TRADE IN WHEAT

Wheat as a commodity of international trade is extremely important. Although complete data are not available, it appears that the international trade in wheat equals the combined volume of all other grains. 1/

The trade routes over which wheat passes in the process of transportation are shown in Figure 47. Every important ocean, sea, and canal on the face of the earth is utilized in the movement of wheat from countries with a surplus to those having deficits.

The chief surplus areas of wheat production are in Canada, Argentina, the United States, Australia and the countries of the Danube Basin, including Hungary, Yugoslavia, Bulgaria and Rumania. Other areas, although of less importance, are found in Northern Africa, in the countries of Morocco, Algeria and Tripoli, in India, Russia and Poland.

The countries having a deficit production, thus necessitating imports, include the United Kingdom, other countries of Western Europe, Turkey, Spain, Italy, Japan, China, and the Scandinavian countries.

In recent years the importance of France, Germany and Italy as large importers of wheat has lessened considerably, due principally to increased domestic production and increased tariff barriers.

The largest portion of Canada's wheat exports go to the United Kingdom, although smaller amounts are taken by Belgium, the Netherlands, Germany, France, Italy, China and Japan. Although United States exports

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1/ See Wheat Studies, Food Research Institute, Stanford University, Volume 15, No. 2.

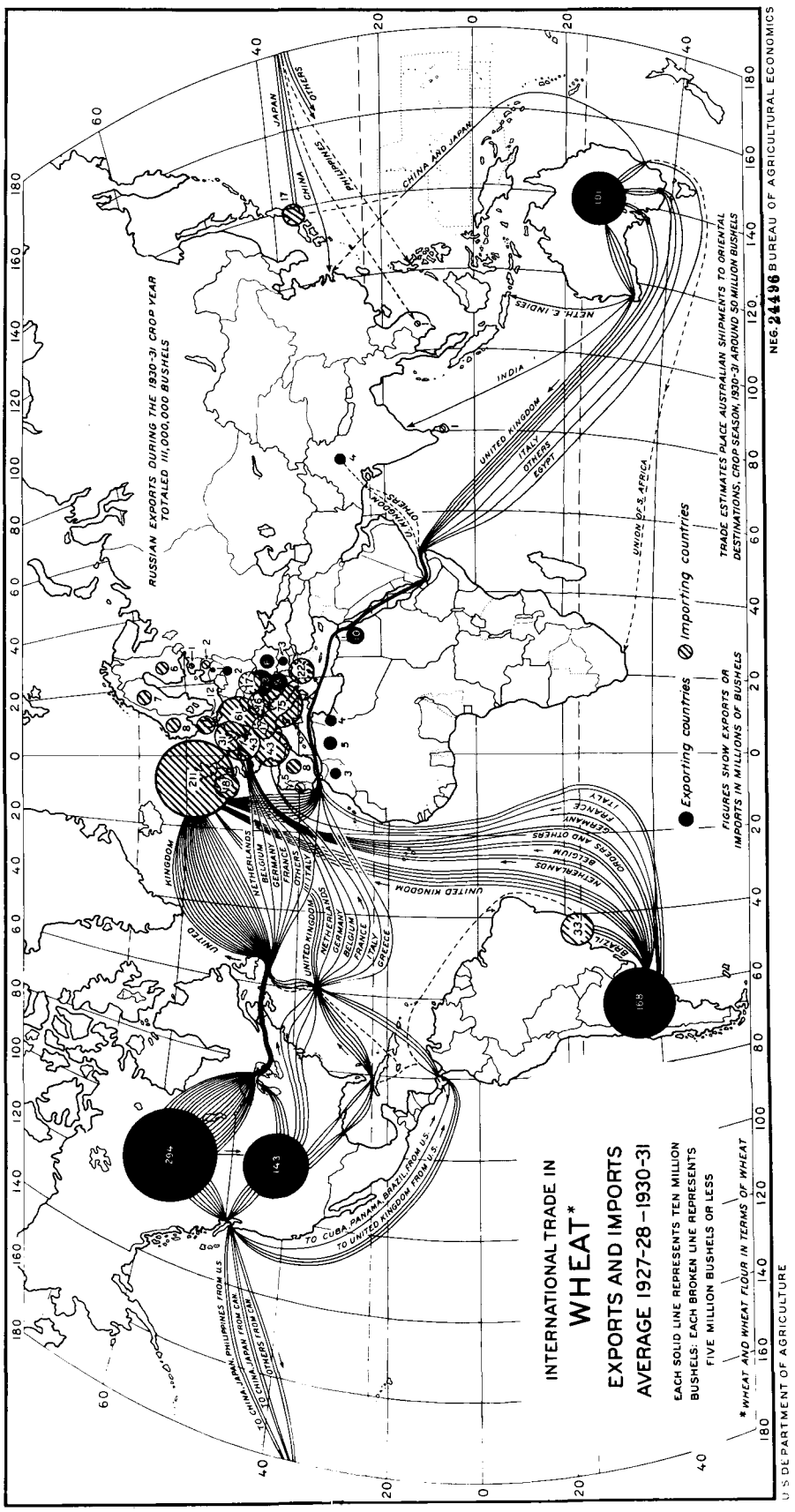
INTERNATIONAL TRADE IN
WHEAT*
EXPORTS AND IMPORTS
AVERAGE 1927-28 – 1930-31
EACH SOLID LINE REPRESENTS TEN MILLION BUSHELS: EACH BROKEN LINE REPRESENTS FIVE MILLION BUSHELS OR LESS
* WHEAT AND WHEAT FLOUR IN TERMS OF WHEAT
Exporting countries
Importing countries
FIGURES SHOW EXPORTS OR IMPORTS IN MILLIONS OF BUSHELS
TRADE ESTIMATES PLACE AUSTRALIAN SHIPMENTS TO ORIENTAL DESTINATIONS, CROP SEASON, 1930-31 AROUND 50 MILLION BUSHELS
RUSSIAN EXPORTS DURING THE 1930-31 CROP YEAR TOTALED 111,000,000 BUSHELS
U.S. DEPARTMENT OF AGRICULTURE
BUREAU OF AGRICULTURAL ECONOMICS
NEG. 24496

FIGURE 47

have fallen to low levels in recent years, the principal importers of our wheat in the past have been the United Kingdom, the Netherlands, Italy, Germany, France, Belgium, China and Japan. Australian exports tend to be utilized by the United Kingdom, Italy, countries of Northwestern Europe, China, Japan and certain areas of Egypt. Argentine wheat finds its way into the United Kingdom, the Netherlands, Brazil, Germany, Italy, France and Belgium. 1/

The exports and imports of wheat, including flour in terms of grain, for important countries since 1920 are given in Table 43. The volume of wheat and flour exports from the principal countries has fluctuated rather violently during the period 1920-1937. (Figure 48).

At the close of the World War the United States was the largest single exporter of wheat and flour, but in 1922 Canadian exports rose and surpassed the United States. Since 1922 Canada has been the chief exporter of wheat, and shipments from this country have steadily declined to a low of 4.6 million bushels in 1935.

Exports from the United States in 1935 were the lowest since 1866. Data prior to this time were not available. Domestic exports of wheat and flour in 1866 total slightly more than 12.6 million bushels, while net exports in the same year amount to about 6.4 percent of our total production. In 1879 net exports from the United States equalled 40 percent of our production, 37 percent in 1920. From 1934 to 1936 short crops resulted in imports of certain classes of wheat for seed and flour purposes. In these years we were a net importer of wheat. 2/

1/ United States Department of Commerce, International Trade in Wheat and Wheat Flour, Trade Promotion Series No. 10, 1925.

2/ United States Department of Agriculture, Agricultural Statistics, 1937. p. 9, Table 1.

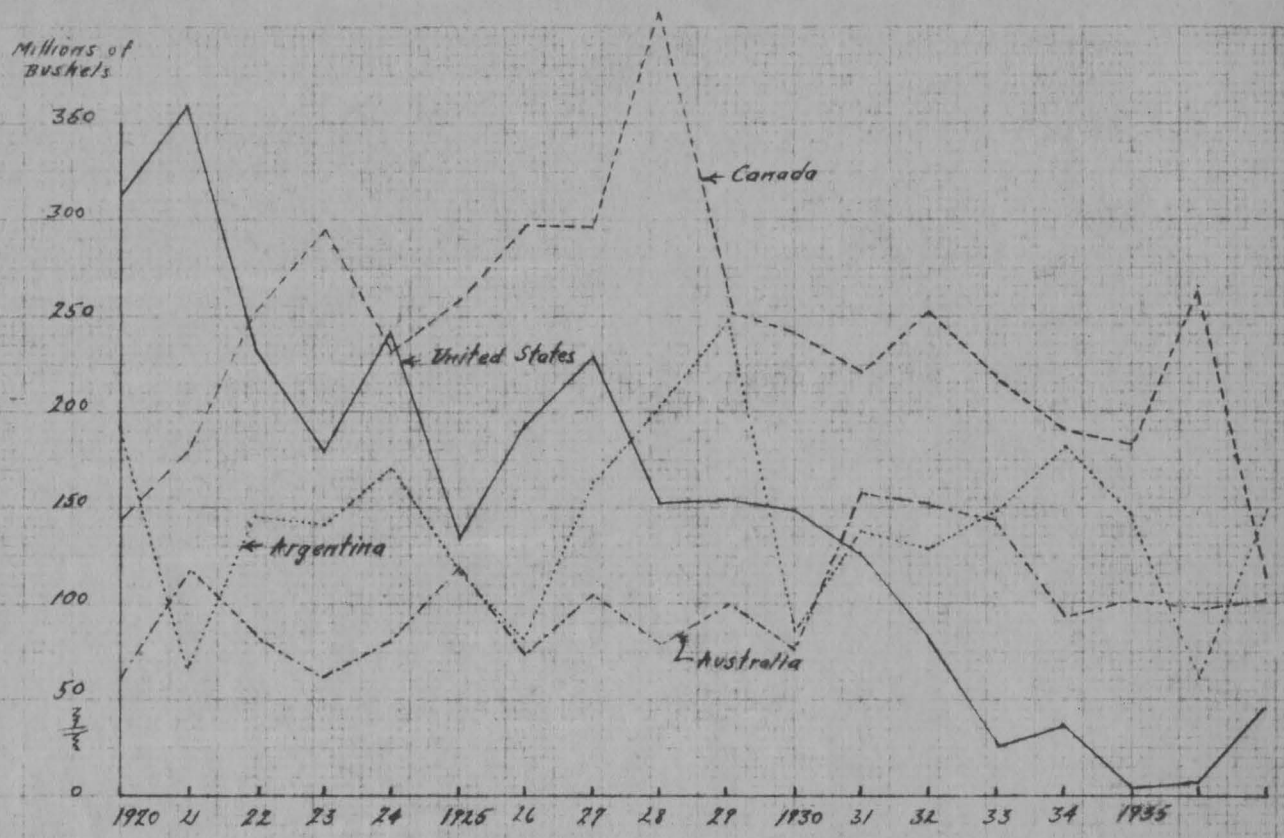

Fig. 48.-Exports of Wheat* From Important Countries, 1920-1937

* Includes flour in terms of grain

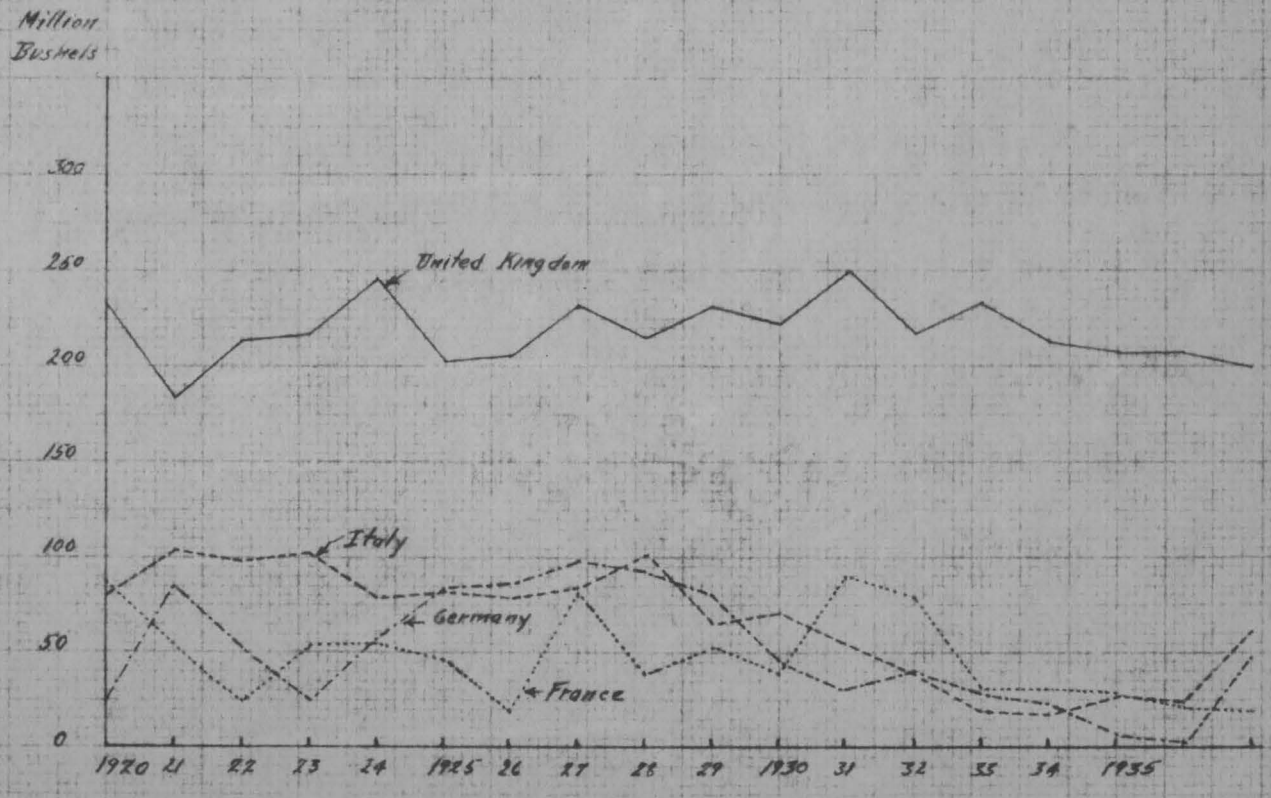

Fig. 49.-Imports of Wheat* into Important Countries, 1920-1937

* Includes flour in terms of grain

Argentine exports of wheat have shown a slight upward trend since 1920. In 1929 a record quantity was exported. In that year total shipments of wheat from Argentina amounted to 203.1 million bushels. In only two years during the period were exports from Argentina larger than those from Canada. In 1920 Argentina exported 193.1 million bushels while Canada had shipments amounting to 144.3 million bushels, and in 1937 the former country had exports equalling 147.6 million bushels against 114.4 million bushels for Canada. Since 1928 exports from Argentina have been larger than those from the United States in every year except 1930.

Australian exports have increased in the period 1920 to 1937. That country exported an average of 81.2 million bushels in the period 1920 to 1924, as compared to 107.5 million bushels for the five years 1933 to 1937.

The volume of imports by deficit countries from 1920 to 1937 did not fluctuate as violently as the volume of exports from various surplus countries. Extreme changes in the quantity of exports are noticeable in Figure 48. One would logically expect such a tendency. Demand for wheat is usually less variable than the supply of wheat. Extreme changes in habits of consumption or domestic production in deficit areas will cause long-time fluctuations in demand, but usually violent changes in demand for wheat are the exception rather than the rule.

Exports are influenced by numerous factors, including production in importing and exporting countries, tariff regulations, trade

agreements, general economic conditions, monetary changes, price levels, and government action. It seems probable that in a majority of cases domestic and foreign supplies, especially in important importing and exporting countries, have considerable influence under existing tariff and trade conditions.

The imports of wheat, including flour in terms of grain, by principal deficit countries during the period 1920 to 1937 are shown in Figure 49.

The United Kingdom is the most important buyer of wheat and flour. In the period 1920 to 1924 the United Kingdom imported an average of 218.9 million bushels per year, compared to average imports of 210.8 million bushels for the five years 1933 to 1937, which was a reduction of about 3.7 percent. Imports of wheat and flour by the United Kingdom have been comparatively stable since 1920.

Italian importation of wheat and flour declined over the period 1920 to 1937 (Figure 49). Italy imported an average of 92.5 million bushels of wheat and flour in the five years 1920 to 1924, while during the period 1933 to 1937 imports averaged 23.3 million bushels, a reduction of about 69.2 million bushels or 74 percent. Italian tendencies for increased domestic production since the instigation of the "Battle of Wheat" have reduced demand for foreign wheats. Along with this decrease in demand, governmental policies of increased tariffs and foreign exchange control have limited the possibilities of importations.

French imports of wheat and flour remained comparatively stable from 1920 to 1931, declining after the latter date to a lower level.

France imported an average of 52.4 million bushels in the years 1920 to 1924, while in the period 1933 to 1937 imports fell to an average of 26.4 million bushels, a reduction of 26.0 million bushels. Wheat production in France increased from an average of 291.4 million bushels in the period 1925 to 1929 to 305.1 million bushels for the 5 years 1930 to 1934.

Imports of wheat and flour into Germany from 1920 to 1928 showed an upward trend. A reversal of trend began in 1929, and since then the decline has been almost continuous until 1937 (Figure 49). Germany imported an average of 48.6 million bushels in the years 1920 to 1924, 87.9 million bushels in the period 1925 to 1929, and 21.7 million bushels in the period 1933 to 1937.

Shipments of wheat from exporting to importing countries can ordinarily take place only when price relationships between the surplus and deficit areas are conducive to purchases and sales for export purposes. This price relationship has been given the convenient name of "wheat export price parity". 1/ Such a condition of relationship refers to "a price in an exporting country as will enable the wheat merchant in the customary course of trade to purchase wheat and deliver it c. i. f. port of destination, so that the importer may unload it and sell it to millers and merchants at going prices as of type, grade and quality, with a profit to exporter and importer". A consideration of export parity does not infer that if

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1/ See Tayler, Alonso E., Speculation, Short Selling and the Price of Wheat, Wheat Studies, Food Research Institute, Stanford University, Volume 7, No. 4, 1931.

such exists between two countries exports must necessarily take place. Other influences also play an important part in determining the importer's choice of country from which purchases are to be made.

The futures market plays an important part in the movement of wheat from one country to another. The possibility for adverse price changes, during the process of transportation, is hedged against by use of the futures market. The Chicago and Liverpool markets are usually used for this purpose, although considerable hedging is done at Winnipeg. Importers usually hedge in the Liverpool market, while exporters, especially those in North America, generally use the Chicago and Winnipeg markets.

When large exports of wheat take place, the domestic price must approach export parity. If certain countries, who are surplus producers of wheat, enter the new crop year with no surplus, while others find large carryovers, it is possible that prices in the latter countries, if at export parity, were higher than those in the former countries, quality considered. If both groups of countries had similar export parity prices, it is possible that the conditions may have been due to a low quality crop in the large carryover countries, as compared to a high quality crop in those successful in exporting their surplus. It is also possible for one group of surplus countries to lose their export trade to another group, if prices in the former were above export parity while those in the latter were at or below export parity.

The shipping differential, as an important element in determining export parity, is defined as the "total cost from the elevator at the departing point of price registration in the exporting country to the

receiving port of price registration in the importing country". 1/ Besides the cost of transportation, it includes numerous other minor, although important, expenses such as cost of inspection, weighing, commissions and interest.

In a sale of cash wheat in North America for exportation, the common method is to close the transaction based on prices at the port of destination in the importing country. The bids by the importers apply to wheat at the port of destination and usually do not include unloading charges. They do include cost of the grain, insurance and freight. The importer usually has considerable advantage over the exporter in the cost of unloading, storage and delivery of the grain after arrival at port. Because of this fact and the high costs involved, most of the transactions are done on a c.i.f. basis port of destination. This fact also accounts for the difficulty an exporter may have when delivering actual grain on a futures contract in Liverpool, without a sale of the actual grain to an importer.

Only under unusual conditions is it possible for an exporter at Chicago, for instance, without making a sale to an importer in the Liverpool market, to purchase a cargo of wheat at the Chicago basis price (future), make a sale in the Liverpool futures market, ship the wheat unsold to Liverpool and delivery such on his Liverpool contract when that matures. This is usually impossible because the shipping differential ends at the port of destination. To deliver grain on a futures contract involves additional expenses such as

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1/ Taylor, Alonso E., Wheat Studies, Volume 7, No. 4, op. cit., page 243.

unloading, storing and delivery upon the exchange. Sometimes it is possible to make a transaction when prices at Chicago are enough below Liverpool to pay for the additional expenses. In such cases, a few transactions would soon bring the prices at both markets back to their correct relationship, either by increasing prices at Chicago or reducing prices at Liverpool.

When a country has a large surplus, domestic prices tend to be adjusted at export parity. That is, prices at Buenos Aires, in the case of Argentina as an exporter, would be enough below Liverpool prices, the United Kingdom as an importer, to make it possible for wheat, quality considered, to be shipped from Argentina to Liverpool and sold at a profit to both exporter and importer. If a country has a large surplus, but due to other factors the domestic price is above export parity, a large carryover will usually result.

As may be seen in Table 28, United States exports of wheat have considerable seasonality. 1/ The largest exports are made during the fall months after harvest. At this time a large supply entering the domestic market tends to depress prices. If domestic prices were at export parity before the new crop, large new crop supplies will tend to depress prices still more and result in more favorable conditions for exports. If prices before the new crop were above export parity and new supplies depress prices below export parity, price relations for export would exist.

Although price relationships between exporting and importing countries are important in the movement of wheat through international

1/ Indexes of seasonal variation based on data in Table 11, Agricultural Statistics, 1937.

trade, it is assumed in the above discussion that importers desire to buy in the particular country concerned. Export parity may exist and still no exports take place. A favorable price relationship is not the only factor to be considered. Trade agreements, tariffs, monetary and credit conditions, trade balances, attitudes of importers and importing governments, and quality are only a few of the factors to be considered in addition to prices.

FOREIGN AGRICULTURAL POLICIES IN REGARD TO WHEAT

Of the many agricultural commodities produced throughout the world, wheat has been subjected to more governmental legislation and control than any other single commodity. This reveals in a manner the importance attached to wheat in the welfare of a national economy.

In the years prior to the late world-wide depression, agriculture in general had been exposed to legislation and control, but most governments were content to assume only policies passive in nature. They have been interested in furthering the prosperity of the agricultural class, but usually limited their action to education, research, improvement of credit facilities, and the betterment of the marketing system. With the collapse of agricultural prices beginning in 1929, numerous governments took definite steps to alleviate the strained conditions, and aid the farmer in securing his share of the national income.

Most governmental policies have had one or more objectives as their immediate aim. Most policies have attempted to increase agricultural prices, and to lessen the farmer's debt burden resulting from the process of deflation. In certain countries the policy introduced and practiced has been influenced by the urgent need to reduce imports and increase exports, to avoid a dis-location of the balance of trade and protect gold reserves. Another important consideration, bearing on the policies of certain countries, has been the desire for increased self-sufficiency. The spirit of nationalism and domestic

self-sufficiency did not originate with the depression, but was given a new impetus. In some cases these ideas were so strong that the policies of the entire state pointed in their direction.

In an important agricultural country, the action to be taken in regard to wheat has been dependent upon the relative importance of that commodity, the government's attitude towards protection, aid, and the nation's financial condition.

All measures, enacted by governments in an attempt to lessen agricultural depression and/or build up domestic producing power, may be divided into three general groups, namely: (1) those pertaining to the restriction of imports, (2) those tending to increase exports, and (3) those influencing domestic production and consumption.

Of the policies aimed at the restriction of imports, the most common is protection in the form of tariffs. Tariffs ordinarily have two uses. They are either levied for the purpose of obtaining revenue or else for the protection of domestic producers against foreign competition. In the United States there have been advocates of a tariff for revenue only, those who favored protection and those who desired to do away with the existing tariff altogether. The second group has usually been the strongest, resulting in our various tariff laws.

In countries where certain agricultural commodities are produced beyond domestic needs, and where exports are necessary to reduce supplies, a tariff for the protection of these commodities tends usually to be ineffective. Tariffs on wheat in the United States have usually been of this type. In 1933, 1934 and 1935, when this

country was on an import basis for certain classes of wheat, due to extremely short crops, the tariff tended to maintain domestic prices above the world level. Ordinarily, the United States produces wheat for export, and if it is to be sold in the world market in large quantities, prices in this country must approach a level which will allow for existing costs of transportation, handling charges, etc. If domestic prices are above the world level, export trade cannot proceed normally. A country making large exports of wheat cannot expect domestic prices above world levels. Large exports and domestic prices above world levels do not occur simultaneously, unless export subsidies in some form are paid by the government.

A surplus of wheat in the United States tends to depress domestic prices to a level which will enable foreign buyers to purchase and ship the commodity to import markets, at a cost not more than necessary to buy and ship from competing countries, quality considered. Large exports tend to decrease local supplies, until supply and demand reach a price equilibrium tending to increase domestic prices to a level, which, plus costs of transportation and handling charges, will not enable an importer to purchase and sell in the world market without a loss.

In an importing country, where due to domestic shortages, imports are necessary, a tariff is a powerful instrument in eliminating competing foreign wheats. It has been the policies of some governments to raise their tariff walls to such heights that imports have been virtually impossible. Domestic producers in these countries have obtained prices considerably above world levels. Prices paid for

domestic wheat in some cases have been so high, the cost of flour and bread so out of proportion to other commodities, that consumers have condemned the practice.

In August, 1938 practically all the important countries had tariff duties on imported wheat. (See Table 44 for rates). At that time United States wheat was subject to rates varying from 4 cents a bushel in Switzerland to $3.82 in Germany.

The general tendency in the past has been for tariff rates to increase in times of depression and diminish in periods of prosperity. Although tariff rates have been high for a longer period than since the late economic depression, during this time they have been a hindrance to international trade. Previous to this period trade agreements containing "most favored nation clauses" gave a degree of stability to tariff rates. Since 1929 many countries have placed their tariff laws at the disposal of the executive branch rather than the legislative branch of government. This action tended to make rates more flexible and easier to increase. A lack of trade agreements during a portion of the period has also reduced tariff stability.

Besides the use of the tariff in an effort to exclude foreign commodities, other practices have come into being. Notable among these are the milling quotas and mixing requirements. In effect they result in monopolistic control over importations. The government under this plan enforces strict regulations, stating the percent of each type of wheat to be used in the manufacture of flour. This usually results in complete utilization of weak domestic wheats and

limits imports to those strong foreign wheats which may be acquired by a practice of barter. This plan also results in a tendency for the acreage of weak domestic wheat to increase or at least be maintained, while it might otherwise decrease if importations of strong foreign wheats were permitted.

Import restrictions in the forms of import monopolies and a system of licensing have also been used. These plans require permits from the government to import, or the purchase of foreign exchange from the government.

In countries where devaluation has taken place, imports have been restricted, due to the higher prices for imported goods. It has also provided, in some cases where there was a lag between the rise in prices and currency devaluation, a stimulus to exports. This method of stimulating exports often results in increased barriers in foreign countries in the form of import restrictions.

Certain countries, in an effort to reduce the proportion of imports to exports by increasing the latter, have entered into agreements based upon mutual preference in trading policies. In effect, they usually amount to a statement in which each country promises to give the other trading preferences and tariff concessions for certain commodities. Among the most common of these trade agreements are the reciprocal trade treaties of the United States and the Empire Preference agreements between England and her possessions. The British Preference System has been a blow to our wheat exports. As a result of the preference given to Empire countries, Canada has a decided trading advantage.

Hand in hand with the devaluation policies of some governments has been the strict control over foreign exchange, which makes possible the allocation of definite amounts for the purchase of imported goods. This practice, along with devaluation, has been used to a considerable extent in Argentina to create a profit from which wheat bonuses could be paid.

Of the policies of exporting nations, having as their objective the increase of domestic exports, there are three principal types, namely: (1) those which result in the payment of export bounties and premiums, (2) those based on a two price system, that is, a domestic price and a world price, and (3) those based upon bargaining and reciprocal trade treaties.

Export bounties have been used by several nations but are not important at the present time. One of the reasons for this plan's unpopularity is the fact that cash payments are not always forthcoming due to stringent credit and financial conditions. Export bounties have been common among the surplus wheat producing regions of the Danube River Basin. Import certificates are considered a form of export bounty. In effect, this plan amounts to an equal exchange of imports for exports, and would not increase net exports. An agreement is usually entered into whereby the country agrees to exchange a quantity of wheat of a given grade and quality for wheat of a different grade and quality. This scheme has been used in exchanging weak domestic wheats for strong foreign wheats.

The second type, that of a two price system, has also been used to some extent by the countries of the Danube Basin. As a general rule, this plan has limited use. The two price system has been proposed several times in the United States. The McNary-Haugen Bill introduced in Congress several years ago, had as its policy the payment of a domestic price for that portion of the crop consumed in this country, and the sale of the surplus on the world market at going prices. The difference between the two prices was to be met by an equalization fee to be imposed upon the commodity in its processing. The Bill in its final form was passed by both Houses of Congress, but was vetoed by President Coolidge. 1/

Some consideration has been given to the third method, that of preferential trade treaties, and it will suffice to say that such agreements, having as one of its parties competitors of the United States in the world wheat market, has adversely influenced our wheat situation.

Policies affecting consumption, production and indirectly net income to the producer have taken a variety of forms. In some countries such as Germany, Italy and Russia, internal control of agriculture has embraced the production, consumption and marketing of the commodity. In these countries agricultural legislation has been given a definite place in their economic program.

1/ Senate Document No. 141, A Message From the President of the United States, Veto Message Relating to the Agricultural Surplus Control Act, 70th Congress, 1st Session, May 23, 1928.

Of the various measures used domestically to improve the farmer's competitive position the use of production bonuses and fixed or stabilized prices has been limited primarily to the deficit areas. In these countries fixed prices have been possible to some extent, because there was a deficit of the commodity and the government's power to restrict imports, thus reducing supplies. When it was impossible to maintain a fixed price by regulating imports, the government would appropriate a sufficient amount to make up the difference between the actual and fixed price. Due to strained financial conditions this method has limited uses. Of the exporting countries Canada, Australia and Argentina have endeavored to pay a fixed minimum price. If no provision is made to control production, these methods tend to increase acreage, and thus magnify the problem.

Certain of the foreign countries have attempted production restriction, but usually with little success. France has used this plan and laws to that effect have been passed, but their enforcement has laxed and in many cases became completely inoperative. In general, with the exception of the United States, governments have had more enthusiasm for agricultural expansion than curtailment, and have usually been more successful with the former, especially in those ocuntries where the goal has been self-sufficiency.

Various other methods have been used to attack the problems from a domestic standpoint. Among these have been credit expansion, reduced taxes, lower freight rates, debt moratoriums and legislation influencing competing products.

It has been the practice of most governments to use a combination of measures. 1/ The use of these practices has had at least three important effects on the world wheat situation. In the first place they have directly interferred with international trade; secondly, they have increased, or at least helped, maintain wheat production in countries where wheat would have otherwise declined; thirdly, they have tended to reduce wheat consumption. The reduced consumption in certain countries has been due to raising the price higher than consumers were willing to pay, while in other countries reduced consumption has been caused by milling restrictions that lowered the quality of flour.

At the present there seems to be little tendency for foreign governments to relax intervention. Some tendency has been exhibited by certain countries to reduce tariff barriers and to instigate trade treaties. It is probable that more reduction in tariffs may take place in the future, accompanying more stabilised prices and a solution of the problems arising from economic maladjustments among nations.

1/ See Table 44 for practices in important wheat importing countries.

WHEAT PRODUCTION

General Considerations

Plant historians are not in agreement with regard to the exact origin of wheat, but the majority seem to think that at the dawn of history the plant was under general cultivation in Western Asia. Some seem to think that the plant originated near the Indus River in the Himalayan Mountains.

Wheat is not a native of North America but was brought here by the early colonists. It was under cultivation in the Virginia colony as early as 1618. The spread of its cultivation followed the settlement of the country and is now grown to some extent in every state in the Union.

The wheat plant has climatic adaptations which makes it unique among plants. It is stated that only barley, potatoes and certain hay crops are grown under colder conditions. 1/ It is also stated that no part of the earth is too hot for this plant, provided the humidity is not too high. The humidity of the tropics restricts its commercial production to the more temperate zones; moist climates being conducive to rust and other wheat plant diseases.

In regard to rainfall, wheat has both humid and arid limits, the humid limit varying with the temperature. In the southeastern portion of the United States very little wheat is grown where the

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1/ Baker, O. E., The Potential Supply of Wheat, Economic Geography, Volume 1, No. 1, p. 24, March, 1925.

average temperature during the growing season exceeds 68 degrees F., and where the rainfall is over 50 inches annually. In areas where the temperature is slightly colder, 40 inches of rainfall tends to mark the humid boundary of wheat production. In this country the majority of wheat is grown in regions where the annual rainfall averages less than 30 inches. For the world in general, near the cold limit of production, 40 inches of precipitation tends to mark the limit of production; while in the warmer sections, 70 inches marks the upper limit. In the colder areas of the United States, such as in the hard red spring and white wheat regions of the North Central and Northwestern states, as well as in the Southwestern portion of Canada, as little as 9 to 11 inches of rainfall have produced a crop. In the warmer areas, where evaporation is high, more rainfall is required.

A minimum of 90 days is usually required for a well matured wheat plant. Fall seedings of wheat are on the ground nine to ten months.

Wheat is grown on a variety of widely different soils, although certain soil types are usually suggestive of an important wheat growing area. Among the most famous wheat soils are the silt loams and clay loams which are rich in organic matter. 1/

Classification of Wheat

According to biological classification, the wheat plant belongs to the grass family, Poaceae Gramineae; to the tribe Hordeae, and

1/ This discussion is based on information taken from Hughes, H. D., and Henson, E. R., Crop Production, The MacMillan Company, 1935.

genus Triticum. This latter group is again divided into species and sub-specie of which the wheat plant belongs to the sativum and tenax divisions respectively. The four common wheats under the sub-specie tenax are club, common, durum and poulard. Common wheat is by far the most important, not only in the United States but throughout the world. About 85 percent of the total acreage in this country is seeded to common wheat, while club wheat makes up about 7 percent, durum slightly less and poulard wheat is not grown commercially to any extent. 1/

Wheat is also classified as to the time it is seeded, spring wheat being sown in the spring and winter wheat being sown in the fall. Wheats are commonly grouped as to color; red, white and amber being the most important.

Another classification commonly used is based upon hardness. The hard wheats are those usually cultivated in regions of hot dry summers. They have characteristics of high gluten or protein content, hard texture and usually low moisture content. They are known in the milling trade as strong wheats because they yield a flour capable of producing bread of good volume and texture under a wide variety of baking conditions.

Soft wheats are usually produced in areas of moderate temperature and abundant rainfall. They are considered weaker in baking quality since they do not lend themselves to a variation in baking treatment

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1/ Hughes and Hansen, op. cit., p. 444.

and do not produce a loaf of good volume and texture. The soft wheats are usually low in protein content, high in moisture, and of soft texture. Certain soft wheats, although weak, have good milling qualities, that is, they produce a high yield of flour of good color.

The common wheats of soft and hard texture are used in making bread flour, cake, pastry and biscuit flour, as well as other cereal flours. Various proportions of hard and soft wheats are used in the preparation of these flours. The better bread flours of high quality are produced from mixtures containing larger amounts of hard wheat. The other flours are usually produced from mixtures containing higher quantities of soft wheat. The durum wheats are used chiefly in the manufacture of semolina from which is made macaroni, vermicelli and other edible pastes. They are sometimes used in blending with the hard and soft common wheats in the making of bread, cake and biscuit flours.

In the United States definite standards have been adopted for the grading of wheat. Prior to the passage of the Grain Standards Act, the nation's commodity exchanges had a system of grading, which was developed out of pure necessity in the commercial buying and selling of wheat. But it was not until the adoption of the official grades that all parties interested in the trade had a uniform method of grading. The establishment of the United States official standards for wheat grading has given definite meaning to the various classes,sub-classes and numerical grades,which has aided the commercial

buying and selling of this all important bread-stuff commodity.

As stated in the Handbook of Official Grain Standards of the United States, "wheat shall be any grain which before the removal of dockage, consists of 50 percent or more of wheat and not more than 10 percent of other grains for which standards have been established under the provisions of the United States Grain Standards Act, and which, after the removal of dockage, contains not more than 50 percent of broken kernels of grain of any size."

According to the Grain Standards Act, wheat is now divided into seven classes: (1) Hard Red Spring, (2) Durum, (3) Red Durum, (4) Hard Red Winter, (5) Soft Red Winter, (6) White and (7) Mixed. Formerly, the Act divided wheat into five commercial classes: (1) Hard Red Spring, (2) Durum, (3) Hard Red Winter, (4) Soft Red Winter, and (5) White. This latter classification was revised for the purpose of differentiating between common durum and red durum and also to create a class into which could be placed those wheats which were badly mixed and which would not fall in any of the other classes. Each of the classes have two or three sub-classes and each sub-class has five numerical grades and a sample grade. The sample grade contains that wheat which will not meet the grading requirements of any of the numerical grades. With the exception of the class known as mixed wheat, the varieties which fall into each class are distinctly different in appearance and in general habit of growth.

World Wheat Production

The statistics on acreage, yield, and production used in this study are those prepared by the Bureau of Agricultural Economics of

the United States Department of Agriculture unless otherwise noted. They are in many instances official estimates made by the agricultural departments of the various countries concerned. When official estimates of this kind have not been available, special foreign correspondents of the United States Department of Agriculture located in the countries have prepared the estimates.

The statistics combining acreage and production in countries having different harvesting dates are placed on a crop year basis, that is, the figures refer to the year of harvest. Harvests of the Northern Hemisphere countries are combined with those in the Southern Hemisphere countries which immediately follow. For example, production for the year 1938-1939 would include the crop in the Northern Hemisphere for the year 1938 and that in the Southern Hemisphere for 1939, the harvest of which begins late in 1938 and ends early in 1939.

When reference is made to a specific crop year or crop years, only the first portion will be stated: thus 1938, meaning the crop year 1938-1939.

All data involving the world, the Northern Hemisphere and Europe excludes the Union of Soviet Socialist Republics and China. This is done because the official estimates which are available for U. S. S. R. are considered to be unreliable, and no official estimates are available for China. This practice is followed by the Bureau of Agricultural Economics. Due to this exclusion the figures representing the world, the Northern Hemisphere and Europe are no doubt low, but it seems reasonable to believe that they include a large enough area to accurately represent trend. They are the best estimates which have been available.

The harvesting dates for the different regions are so variable that wheat is produced in varying quantities in every month of the year. In the Northern Hemisphere the largest amount is produced in the latter portion of the calendar year. In the United States harvest usually commences in June in the Southern states and ends in the Northern states in late August and September. The important wheat regions of the Prairie Provinces of Canada usually begin their harvests in late July and continue through August and September. In Europe harvest begins in certain of the southern areas in May and is completed in the northern countries in October. In India and the surrounding regions, it begins in March and continues through May. China has harvesting dates similar to ours, June through July.

In the Southern Hemisphere harvest usually commences in December and is completed in January. This is especially true of the two important countries, Australia and Argentina. Taking the world as a whole, the largest quantity of wheat is produced in the period from June to September.

World Acreage Harvested 1/

Figure 50 shows the distribution of the world acreage of wheat, based upon the average acreage harvested for the five crop years 1930 to 1934. Wheat acreage as a whole is widely distributed, but in the important regions is rather concentrated. In North America the important area is found in the central portion, while in Europe the

1/ Data on acreage seeded has not been available for countries other than the United States.

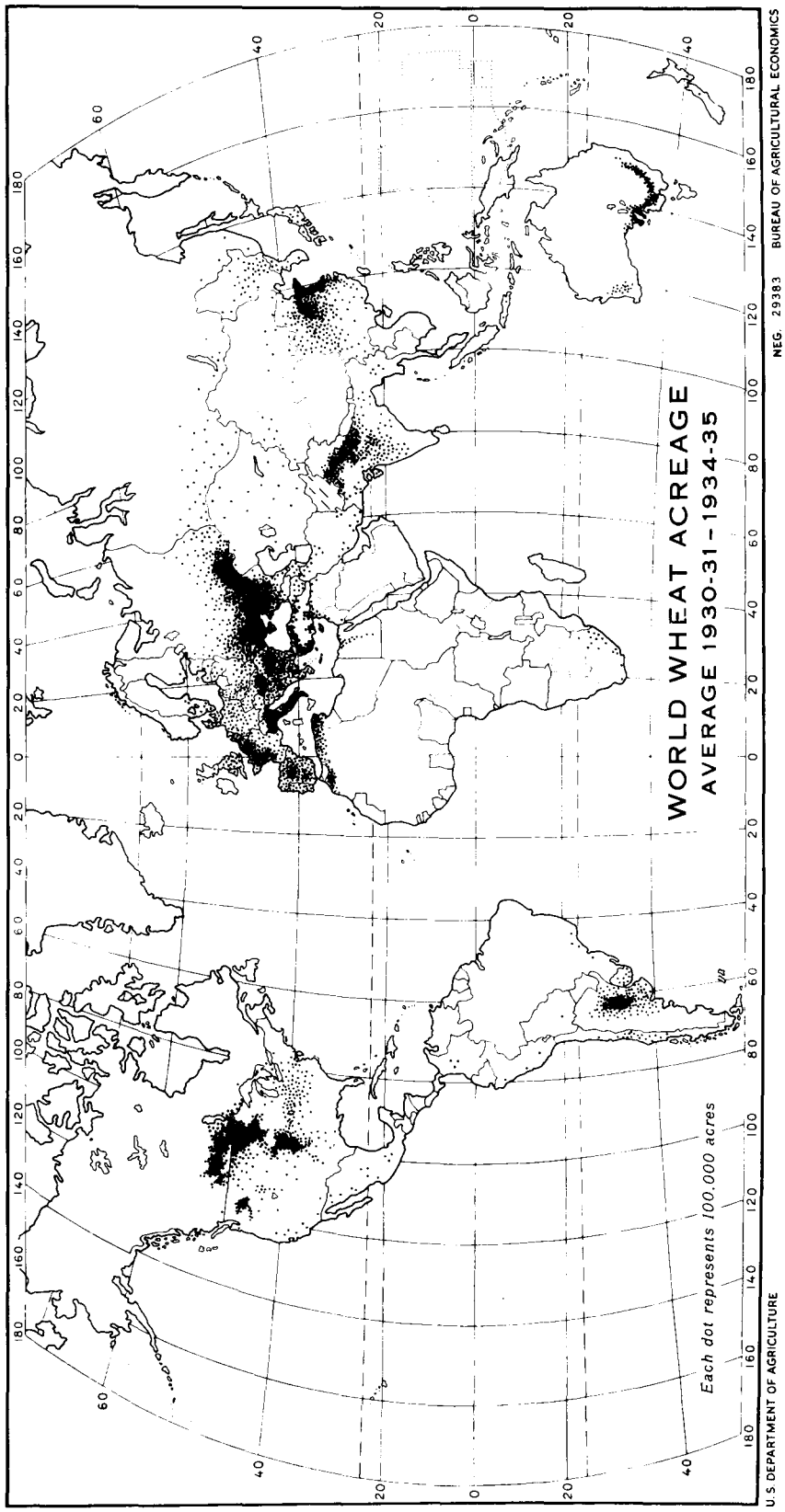
WORLD WHEAT ACREAGE
AVERAGE 1930-31-1934-35
Each dot represents 100,000 acres
U.S. DEPARTMENT OF AGRICULTURE
NEG. 29383 BUREAU OF AGRICULTURAL ECONOMICS

FIGURE 50

important wheat areas are more dispersed. The principal areas are found south of 55 degrees north latitude. In Africa the acreage is concentrated in the extreme northern and southern parts. The important areas in Asia are found in the extreme southern portion, principally India, and in the extreme southeastern part, including China. In South America the largest acreage is found in the southern portion between 25 and 42 degrees south latitude. In Australia the extensive acreage is limited to the extreme southeastern division. The average annual world acreage of wheat for the five crop years 1930 to 1934 was estimated at 254.1 million acres, as compared to 243.2 million acres for the period 1925 to 1929, an increase of about 10.9 million acres (Table 45). World wheat acreage has been increasing steadily for a period of years. 1/ In the Northern Hemisphere wheat acreage increased from an annual average area of 205.3 million acres in the period 1925 to 1929 to 215.6 million acres for the five years 1930 to 1934, or slightly over 5 percent. In recent years the acreage in the Northern Hemisphere has constituted about 89 percent of the estimated world total. North American acreage, which during the period 1925 to 1929 constituted about 34 percent of the world total, declined from 82.6 million acres during this period to 81.1 million acres for the five years 1930 to 1934.

Comparing the same two periods, acreage in the Southern Hemisphere, which is composed principally of that in Australia and

1/ United States Department of Agriculture, Outlook Charts, Wheat and Rye, 1939, p. 13.

Argentina, increased about 600 thousand acres, or only slightly over 1½ percent.

Since the World War acreage in Europe has been increasing almost constantly. 1/ In 1922 there was harvested slightly over 65 million acres, while in 1935, a year of record acreage, there was harvested about 78 million acres. Europe's average annual acreage for the five years 1925 to 1929 was about 70.4 million acres, as compared to 76.1 million acres for the period 1930 to 1934. Europe as a whole is a deficit area but it does have areas of surplus. Its largest surplus area is found in the countries of the Danube Basin, including Hungary, Yugoslavia, Bulgaria, and Rumania. This region had an average acreage of 19.8 million acres for the years 1930 to 1934, an increase of about 5 percent over that in the period 1925 to 1929.

In a comparison of the wheat acreages in specified countries based on the average annual acreages for the two periods 1925 to 1929 and 1930 to 1934, it is found that Canada increased her acreage about 2.5 million acres or slightly less than 11 percent, while during the same time the United States had a decreased of almost 4.1 million acres or about 7 percent. France and Italy increased their acreages slightly, while Germany's rose from slightly over 4 million acres to almost 5.1 million acres, or an increase of about 29 percent. Australia and India increased their respective acreages by 2.4 million acres or almost 19 percent and 1.8 million acres, or slightly less than 6 percent. Over the two periods previously mentioned, of the important

1/ Outlook Charts, Wheat and Rye, op. cit., p. 15.

wheat producing countries for which data are available, only Argentina reduced acreage. During the first period, 1925 to 1929, she had an average acreage of about 19 million acres, while in the later period, 1930 to 1934, she had an acreage of 17.1 million acres, a decrease of about 1.9 million acres.

The data available for U. S. S. R. show a tremendous increase in acreage. Based upon the average acreage in the two periods, 1925 to 1929 and 1930 to 1934, the area in wheat had increased 14.8 million acres, or about 21 percent.

Wheat Yields

Table 46 shows the yield per acre of wheat in important wheat producing countries. Yield depends so much upon climatic conditions that in areas where rainfall is a controlling factor it is often quite variable.

In a study conducted by the Food Research Institute of Stanford University, nine year moving averages of yield in important countries and areas were prepared for the period 1890 to 1932. 1/

For the countries of Northern Europe, excluding France, the trend of yield per acre from 1890 to 1910 was upward, from 1910 to 1920 the trend was downward, and since 1930 the trend has been up. The nine year moving averages centered on 1890, 1910 and 1930 were 21.1 bushels, 25.6 bushels and 27.3 bushels per acre respectively.

1/ Bennett, M. K., Trends of Yield in Major Wheat Regions Since 1885, Food Research Institute, Wheat Studies, Volume XIV, No. 3, November, 1937.

The countries of Southeastern Europe had a relatively constant yield from 1890 to 1913, declining during the war period and increasing after 1920 to approximately the same level in 1930 as in 1890 and 1910. Since 1900 the region described as Western Mediterranean, including the countries of Spain and Portugal in Europe and the countries of Northern Africa, has maintained a relatively stable yield per acre, the nine year moving averages concentrating around 11 bushels per acre.

In South America there was a downward trend during the period 1890 to 1915, with a distinct upward trend since. Australia's yield per acre has been variable over the past 50 years. The moving average centered on 1890 was 8.5 bushels. This declined about 20 percent by 1898. A substantial increase took place thereafter, which culminated in an average yield centered on 1910 of 11.1 bushels. Although the average yield by 1924 was considerably above 11.1 bushels, a decline took place and resulted in a moving average centered on 1930 of 11.4 bushels.

In the United States there has been three distinct trends in yield per acre, based upon the type of wheat considered. In the soft red winter belt the trend over the period 1890-1930 showed a gradual increase. For this area, the nine year moving average centered on the year 1890 was 14.8 bushels; on 1910, 15.8 bushels; and centered on 1930, 17.4 bushels.

In the spring wheat belt the trend from 1890 to 1910 was relatively stable at about 13 bushels per acre. Beginning in 1910 there was a

gradual decline, until the moving average centered on 1918 was about 9 percent less than in 1910. A slow increase in trend began in 1919 and continued until 1926, when the average centered on the latter year was about 9 percent above that of 1918 or approximately equal to that of 1910. The trend suddenly turned downward after 1926 and the moving average centered on 1930 equalled 10.7 bushels, which was a decline of 2.3 bushels in five years.

In the hard red winter belt of the United States the trend of yield per acre has been slightly downward, but not nearly as pronounced as that in the spring belt.

Between 1890 and 1910 the trend of yield in the Prairie Provinces of Canada was relatively stable at about 18 bushels per acre. In 1913 a sudden decline began similar to the one in the United States spring wheat belt but more drastic, and culminated in a moving average centered on 1920 of about 23 percent below that of 18.4 bushels in 1910. During the early 1920's the trend rose and resulted in an average for 1925 of approximately 18 bushels per acre, similar to the yield in 1890.

Wheat yields in the Pacific Northwest were on the increase from 1890 to 1913, when the respective moving averages centered on those years were 18.4 and 19.8 bushels per acre. Since 1913 the general trend has been similar to that found in the hard red winter wheat belt, with the exception that since 1925 the yield has been relatively more stable, failing to decline as substantially after 1930.

Of the 13 countries listed in Table 46, five had lower and 8 had higher average yields in the period 1930 to 1931 than in the 5 years 1925 to 1929. Four of the countries had yields in the first period less than 1 bushel different from those in the later period. Of the countries having lower yields in the later period, rust and drought reduce yields considerably in the United States and Canada. Of the 8 countries having increased yields, most of them had only a slightly higher yield in the later period. The greatest increase was in Germany. This country had an average yield of 32.1 bushels per acre in the period 1930 to 1934, as compared to 29.4 bushels in the years 1925 to 1929 or an increase of 2.7 bushels. This increase was substantial considering the already high yield.

Production

The quantity of wheat produced in any particular area is dependent on the number of acres harvested and the yield per acre. Acreage harvested is acreage seeded less acres abandoned for various reasons such as drought, rust, frost, etc. The latter is dependent upon the farmer, while the yield is only partially determined by his action. The farmer may, through proper management and fertilisation, control to some extent, the yield over a period of time, but in any individual year climatic conditions are responsible for the greater variations in yield.

As shown in Figure 51, the world production of wheat, excluding U. S. S. R. and China, has been increasing since 1890. 1/ Based upon

1/ United States Department of Agriculture, Agricultural Statistics, 1938, p. 15, Table 5.

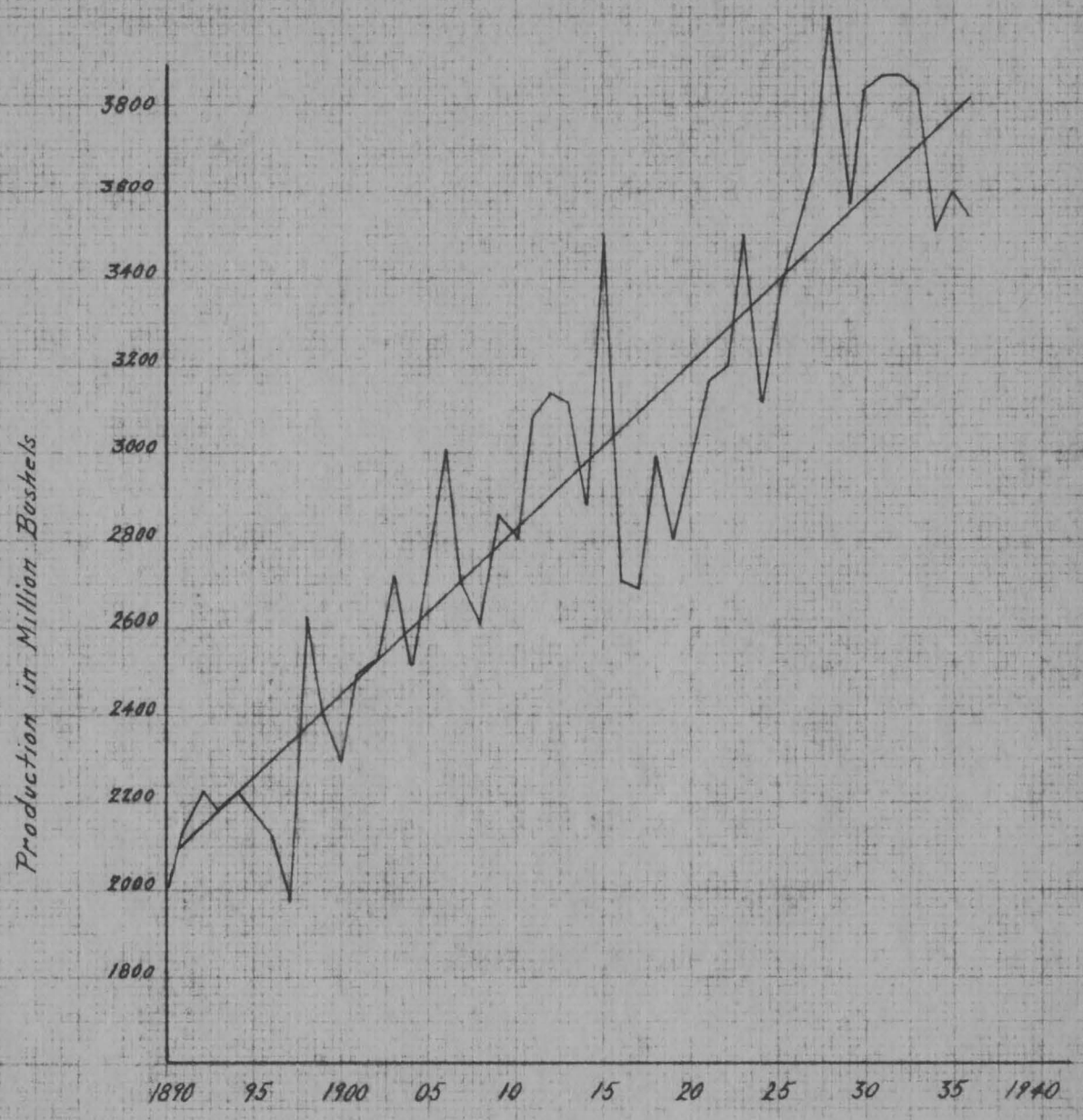

Fig. 51.- All Wheat: World Production and Trend. 1890-91 to 1937-38

$y = 2.949 + 37.8x$

Origin at 1913-14

a mathematically calculated straight-line trend, the rate of increase has been 37.8 million bushels per year, or 1.3 percent of the average for the entire period, 1890 to 1936. 1/ Due to the large area included and the great variation in climatic conditions from year to year, the world production of wheat is quite variable.

During the World War period a substantial reduction in European production had its influence on the world trend. In the period 1930 to 1934 European production constituted about 40 percent of the world total, excluding U. S. S. R. and China. Although European production in the war period caused a reduction in the world total, this decrease was accentuated by reduced yields in the United States and Canada.

The average world production of wheat for the period 1925 to 1929 was estimated as 3,623 million bushels, as compared to an average of 3,797 million bushels in the five years, 1930 to 1934. Even though, prior to the 1938-1939 crop year, the record production of 3,996 million bushels in 1928 occurred in the first period, the production in the latter increased 174 million bushels. Short crops in the United States and Canada due to drought and rust in part of the 1930 to 1934 period, decreased production (Table 47).

Since 1890 European production has shown two distinct trends, although both in the same direction (Figure 52). 2/ The first began in 1890 and ended with the outbreak of the World War. During this period the rate of increase, based upon a straight-line trend, amounted

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1/ $Y = 2,949 + 37.8\ X$, (millions of bushels), Origin at 1913.

2/ Agricultural Statistics 1938, op. cit., p. 15, Table 5.

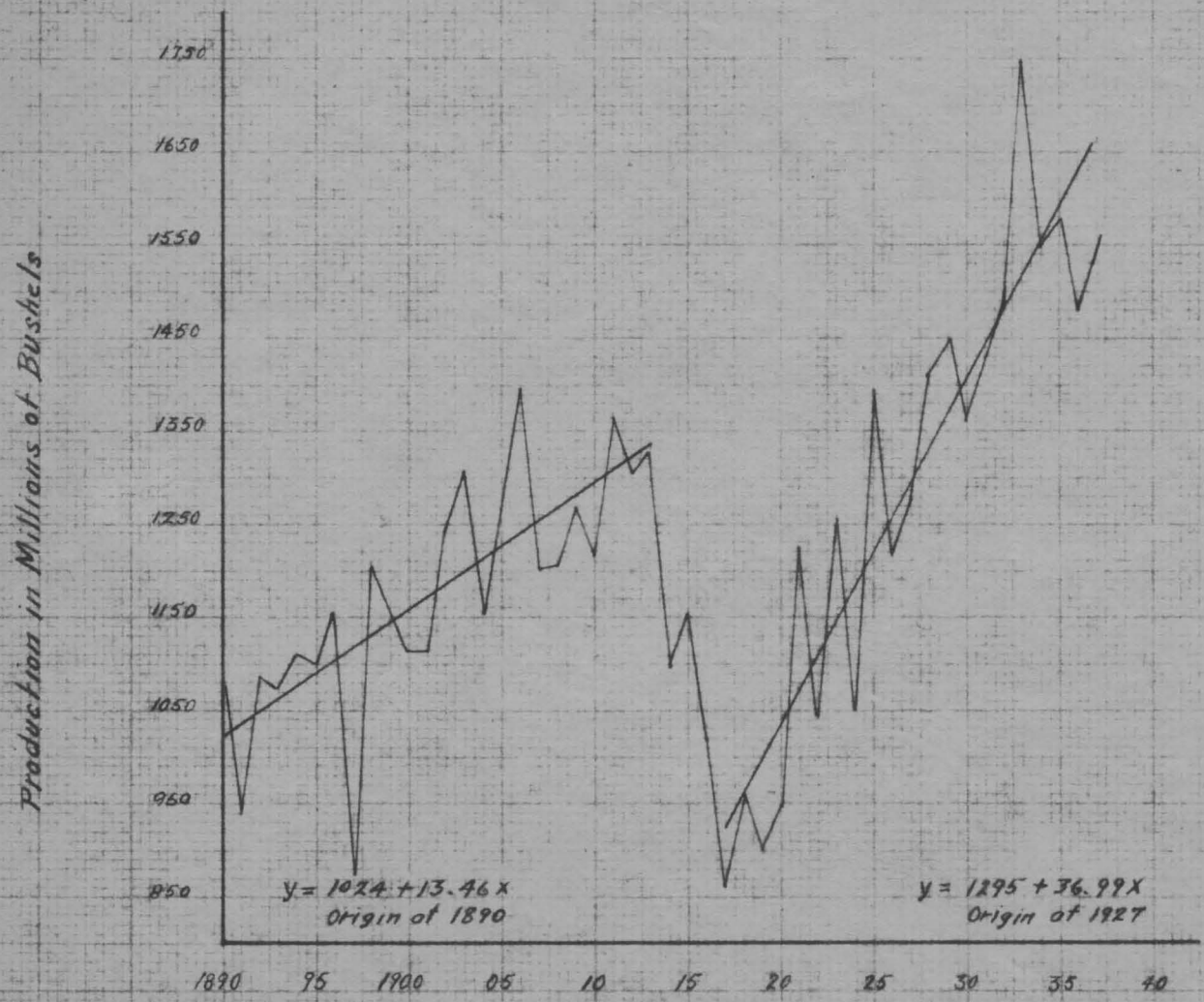

Fig. 52.- All Wheat: European Wheat Production from 1890 - 1937

to 13.46 million bushels per year or 1.3 percent of the trend value of the first year, 1890. 1/ During the World War a tremendous decline in production took place and by 1917 it was only 65 percent of that in 1913. The outbreak of hostilities had reduced the available men and acreage which could be devoted to wheat production. Upon the completion of the War European production again increased and at a more rapid rate than in the pre-war period, until in 1933 Europe had an estimated record crop of 1,745 million bushels. This crop was 102 percent over the low of 865 million bushels in 1917. In the second period, 1917 to 1937, European production increased at the rate of 37 million bushels per year, which amounted to about 4 percent of the trend value for the first year (1917), or 2.8 percent of the average for the period. 2/

In the five years 1925 to 1929, European production was estimated at 1,350 million bushels, as compared to an average of 1,516 million bushels for the period 1930 to 1934, an increase of about 166 million bushels. In the same two periods the surplus areas of the Danube River Basin produced an average of 306.5 million bushels in the first period, and in the latter period an average of 312.3 million bushels (Table 47). In the last 12 years production in this area has shown a slight upward trend. 3/

1/ $Y = 1024 + 13.46\ X$, (millions of bushels), Origin at 1890.

2/ $Y = 1295.1 + 36.99\ X$, (millions of bushels), Origin at 1927.

3/ Includes the countries of Hungary, Yugoslavia, Bulgaria and Rumania. See Agricultural Outlook Charts for Wheat and Rye, 1939, p. 14.

During the 5 years, 1925 to 1929, the countries of North America had a total average production of 1,264 million bushels as compared to an average of almost 1,094 million bushels during the period 1930 to 1934, a decrease of some 150 million bushels. The data for North America are practically an addition of United States and Canadian production and during the last 12 years have shown a slight downward trend. 1/

Southern Hemisphere production, of which that in Australia and Argentina make up about 85 percent, increased from an average of 447 million bushels in the years 1925 to 1929 to 499 million bushels, the average for the period 1930 to 1934. In recent years, 1935 to 1937, the production of wheat in this portion of the world has been below the 1930 to 1934 average (Table 47).

Figure 53 shows the production of wheat in Argentina for the period 1890 to 1937. 2/ In 1890 this country produced a crop estimated at 31 million bushels, while in 1928 one of 349 million bushels, an increase of 318 bushels or over 11 times. From 1890 to 1928 the trend was definitely upward, while in recent years it has tended to be more level. 3/ In the period 1925 to 1929 Argentine production averaged 243

1/ Agricultural Outlook Charts, op. cit., p. 14.

2/ Trend lines for Argentina, Canada and Australia were calculated by the semi-average method.

3/ Agricultural Statistics, 1938, op. cit., p. 15, Table 5.

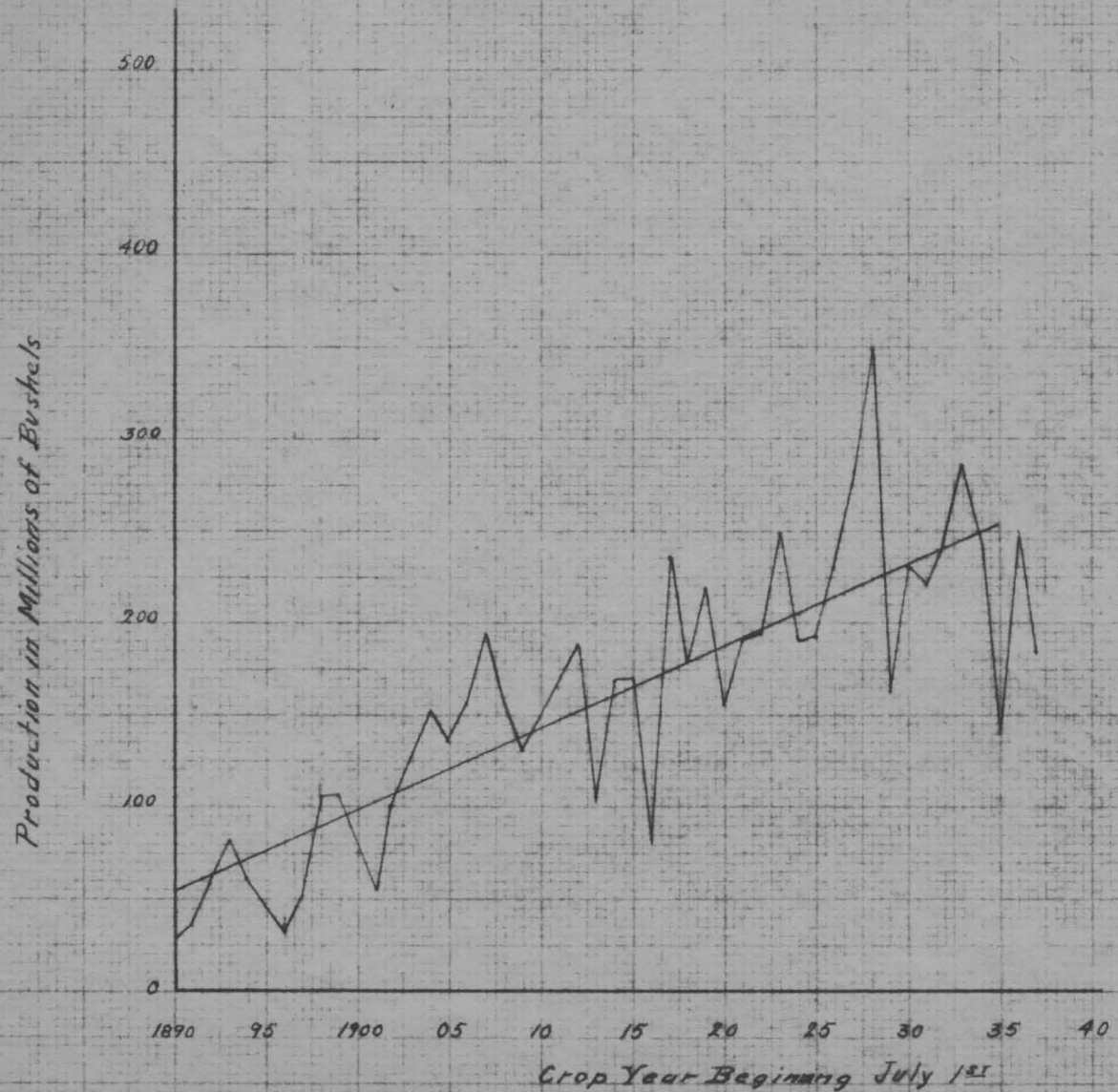

Fig. 53.-All Wheat: Argentine Production from 1890-1937

million bushels as compared to an average of almost 244 million bushels in the five years 1930 to 1934, an increase of about 1 million bushels. During the latter period this country's production amounted to about 6.4 percent of the estimated world total. This small figure may lead one to believe that Argentina is not very important in the world wheat situation, but of the total domestic production only a small portion is consumed in the Argentine, leaving a substantial surplus to be exported to deficit areas. 1/

Canadian production for the period 1890 to 1937 is shown in Figure 54. As may be seen, the trend has been definitely upward until the 1930's, when drought and rust reduced production considerably. In 1928 Canada produced a record crop of 567 million bushels as compared to 42 million bushels in 1890. The average annual production for the five years 1890 to 1894 was 43 million bushels, while that for the period 1925 to 1929 averaged 431 million bushels, an increase of about 10 times. During the period 1930 to 1934 Canada's production, although reduced below average by drought and rust, was about 9 percent of the estimated world total. During the same period 64 percent of her production entered into international trade. This latter figure gives some indication of Canada's importance as a surplus producing area.

Figure 55 shows Australian production of wheat from 1890 to 1937. Based upon data for the five years 1890 to 1894 and the five years 1930 to 1934, Australian production increased over 6 times, from an

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1/ Agricultural Statistics, 1938, op. cit., p. 15, Table 5.

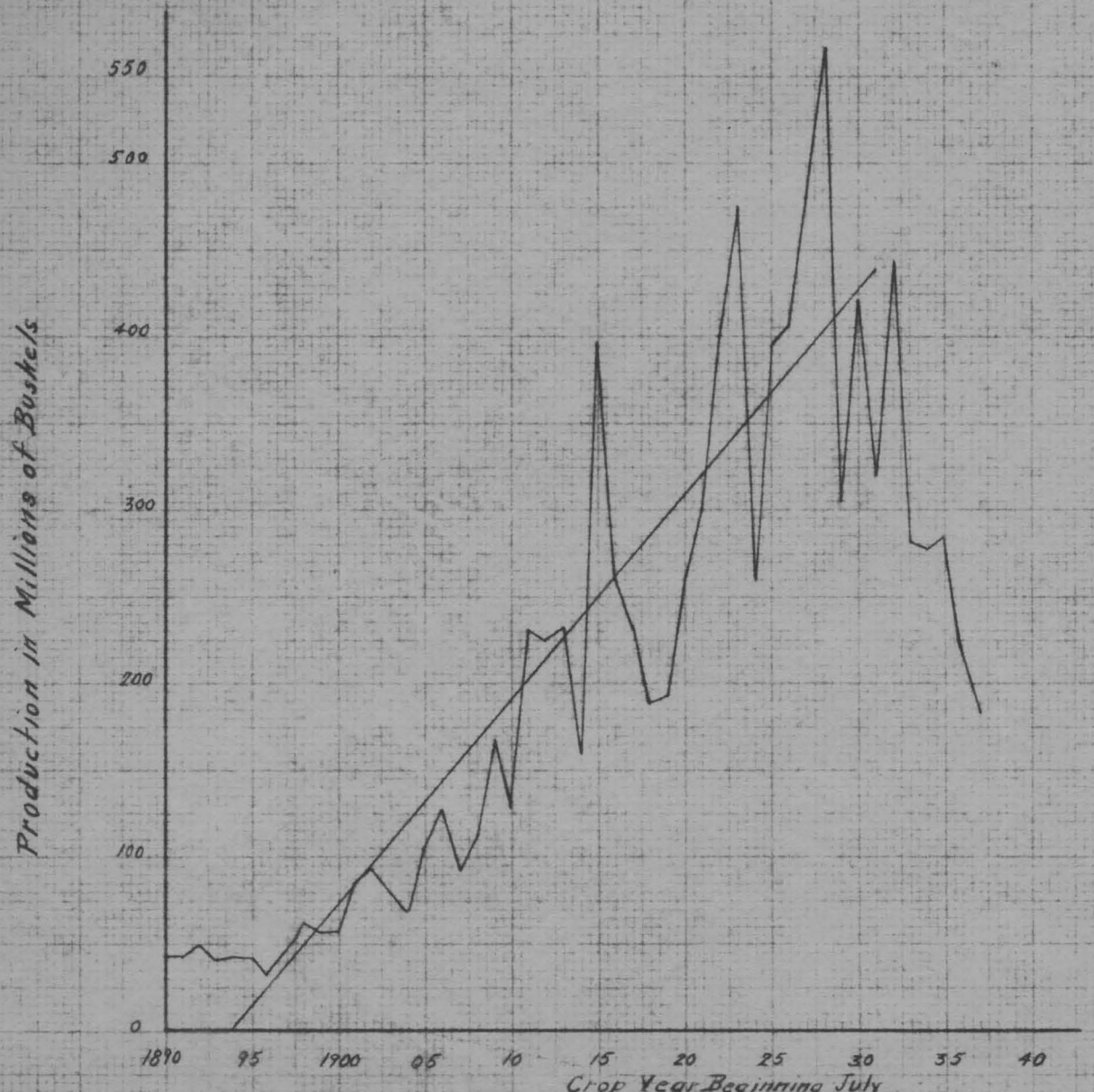

Fig. 54.-All Wheat: Canadian Production & Trend 1890-1937

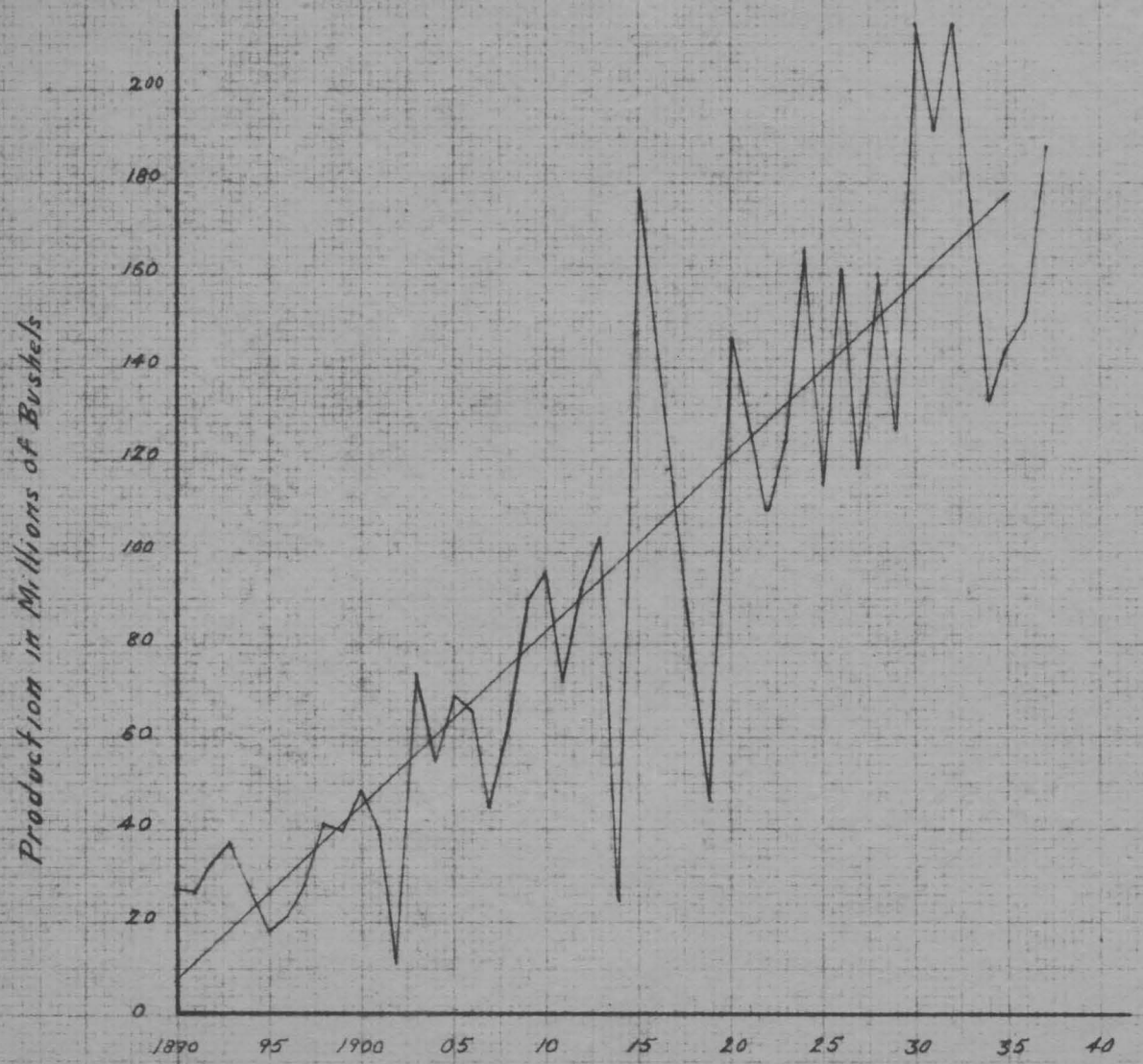

Fig. 55.- All Wheat: Australian Production & Trend 1890 - 1937

average crop of 30 million bushels in the earlier period to one of 186 million bushels in the later period. In the years 1930 to 1934 wheat production in Australia constituted about 4.8 percent of the world total, excluding U. S. S. R. and China, while during the same period this country exported about 67 percent of her entire crop. 1/

The estimates available for U. S. S. R. tend to show a considerable increase in production in recent years. According to estimates published by the Bureau of Agricultural Economics, wheat production in U. S. S. R. averaged 791 million bushels in the five years 1925 to 1929. In the period 1930 to 1934 it was estimated the crop averaged 924 million bushels, an increase of about 17 percent over the first period. As has been previously stated, the data for this region are considered to be rather inaccurate.

World production of wheat and trend since 1920 is shown in Figure 56 and world total supply since 1922, excluding U. S. S. R. and China, is shown in Figure 57. 2/

Wheat Production in the United States

Estimates of wheat acreage and production in the United States prior to 1866 have not been available. The data for acreage since 1866 refers to the area harvested rather than seeded. Based upon acres of wheat harvested, the area devoted to wheat production in the

1/ World Production data, Agricultural Statistics, op. cit., p. 15, Table 5, supply data, United States Department of Agriculture, Wheat Situation, February, 1939, Table 16.

2/ World Production data, Agricultural Statistics, op. cit., p. 15, Table 5, supply data, United States Department of Agriculture, Wheat Situation, February, 1939, Table 16.

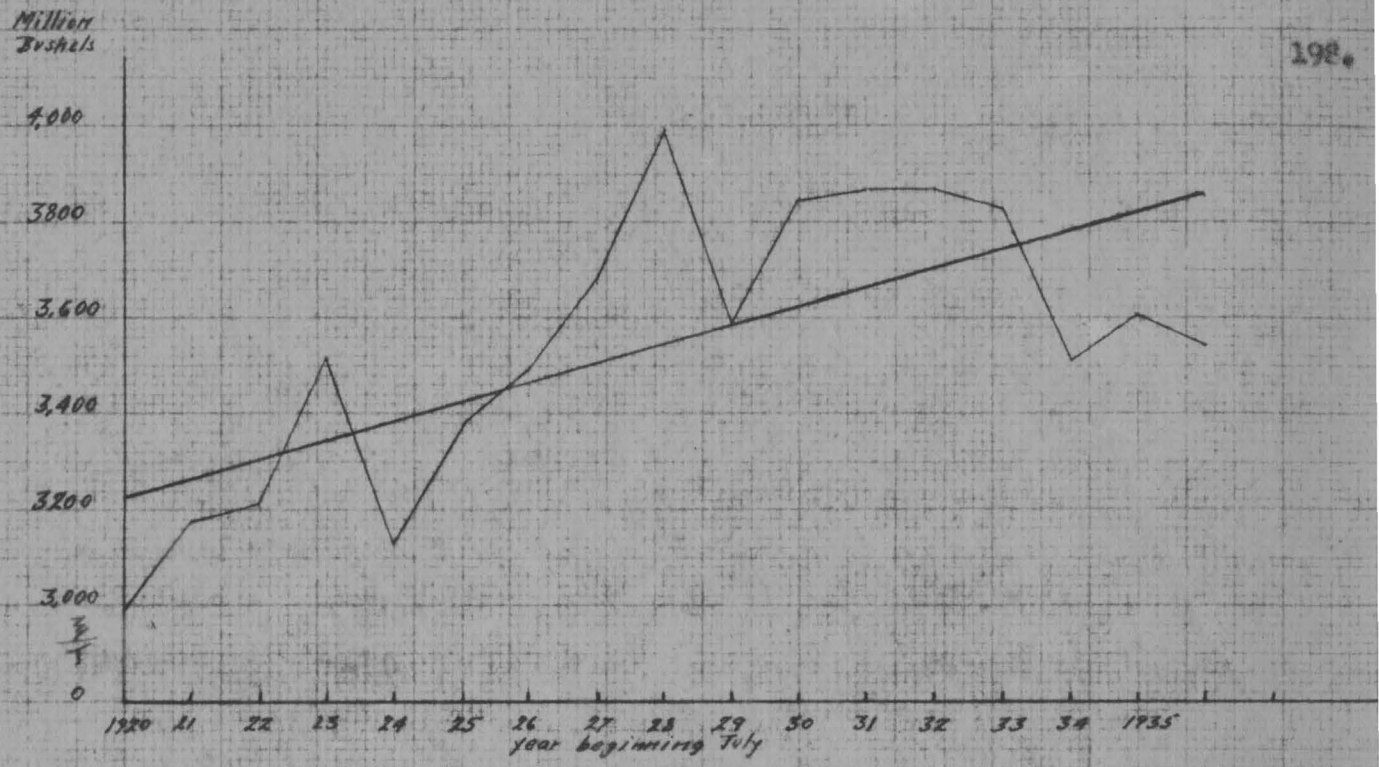

Fig. 56 - World Production of Wheat Excluding Russia and China, 1920-1936
$y = 3541.9 + 38.9x$
origin 1928

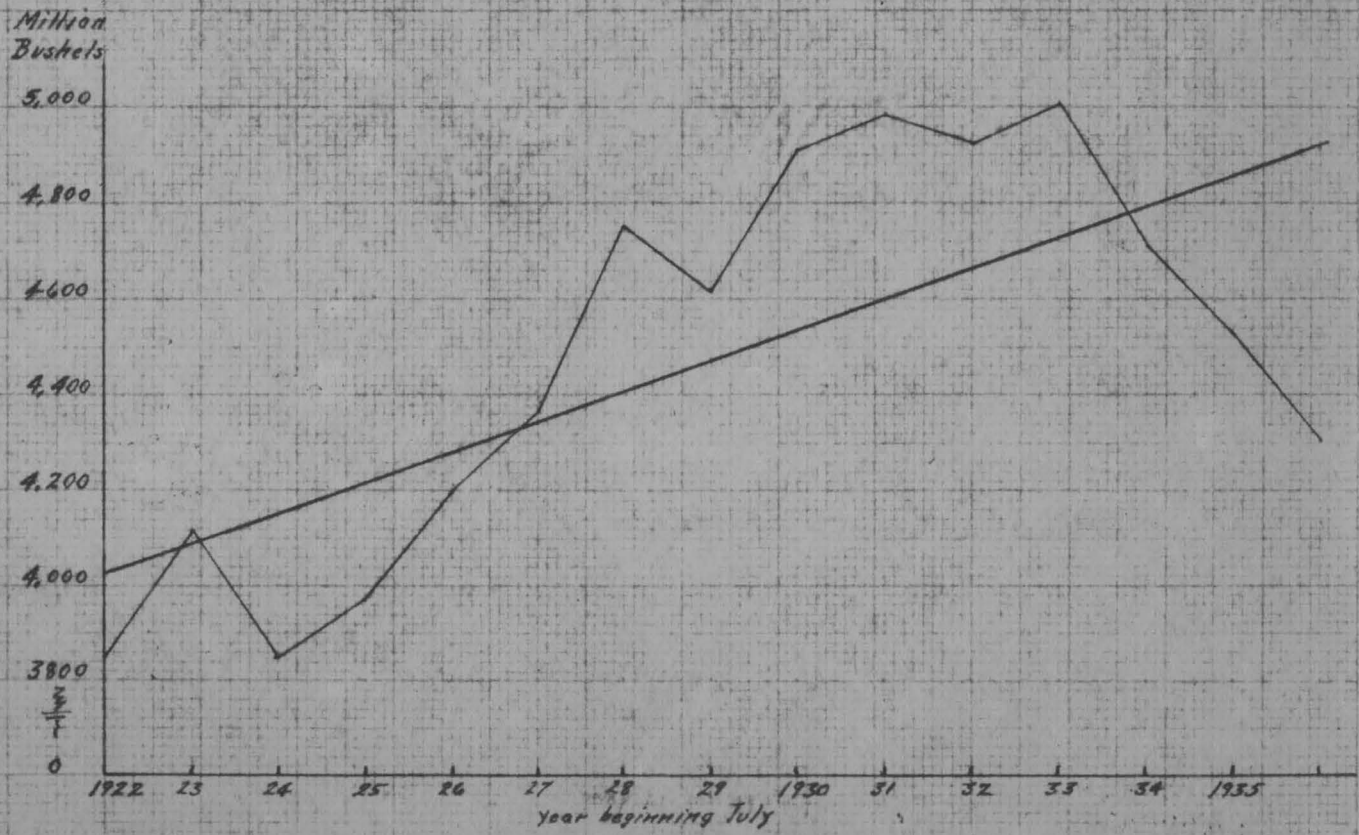

Fig. 57 - World Total Supply of Wheat, Excluding Russia and China, 1922-1936
$y = 4473.5 + 63.1x$
Origin at 1929-'30

United States shows a gradual increase from 1866 to 1920. Since the latter data there has been a slight downward trend. In 1866 there was harvested an estimated 15.4 million acres, while in 1919 the area was 73.7 million acres, an increase of more than 478 percent. 1/

During the period 1925 to 1929 there was harvested an average acreage of 58.2 million acres, while the average for the period 1930 to 1934 was estimated to be 54.2 million acres, a decline of about 4 million acres. In 1935 and 1936 the harvested acreage was below the 1930 to 1934 average by 3 and 5.3 million acres, respectively. 2/ In the same two years it was estimated that the acreage seeded amounted to 69.2 and 73.7 million acres. 3/ During the years 1933 to 1936 a considerable area was abandoned because of drought and rust.

Wheat yields since 1866 show a slight upward trend. A record yield was attained in 1915 when it was estimated the yield for all wheat in the United States averaged 16.7 bushels per acre. The lowest yield on record occurred in 1876 when it amounted to 10.9 bushels. In recent years the lowest yield occurred in 1932 when it was estimated at 11.2 bushels per acre. 4/

In Figure 58 is shown the production of wheat in the United States since 1866. A second degree parabola has been used to describe the trend. 5/ From 1866 to about 1920 the trend in production was

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1/ Agricultural Statistics, 1938, op. cit., p. 9, Table 1.

2/ Table 45.

3/ Agricultural Outlook Charts, Wheat and Rye, 1939, p. 3

4/ Agricultural Statistics, 1938, op. cit., p. 9, Table 1.

5/ $Y = 671{,}309 + 8223X + (-142)X^2$, thousands of bushels, Origin at 1902.

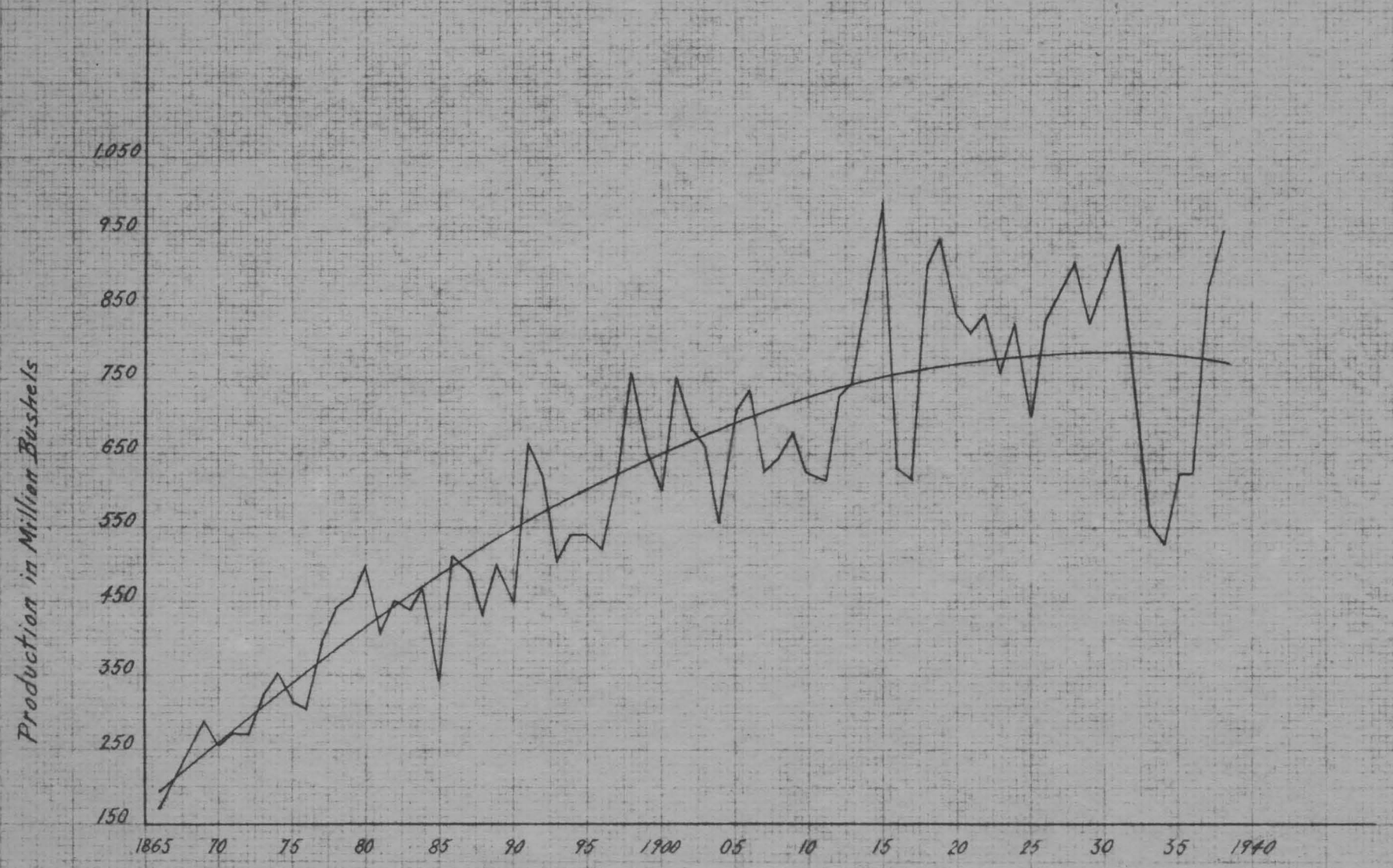

Fig. 58.- All Wheat: United States Production and Trend, 1866-1938

$y = 671{,}309 + 8223x + (-142)x^2$

Origin at 1902

upward, but since the latter date has tended to be somewhat level. United States total production in 1866 was estimated at 169.7 million bushels as compared to a crop of 875.7 million bushels in 1937. The average production for the 5 years 1925 to 1929 was 822.7 million bushels, while that for the period 1930 to 1934 amounted to 732.6 million bushels, a decline in the latter period of about 90.1 million bushels. 1/

Total wheat acreage in the United States is widely distributed, but large portions are centered in important producing areas.

With respect to total acreage of wheat, Kansas is the most important state. In the five years 1928 to 1932 wheat acreage in Kansas averaged slightly over 12 million acres or about 21 percent of the United States total. North Dakota is the second most important wheat producing state, and in the same period had an estimated area of 9.6 million acres, or about 16 percent of the total wheat acreage in the United States. Based upon acreage data for the 5 years 1928 to 1932, the eight most important states were Kansas, North Dakota, Oklahoma, Montana, South Dakota, Nebraska, Texas and Washington, in the order named. Based upon production data for the same period, the states in order of importance were Kansas, North Dakota, Nebraska, Oklahoma, Montana, Washington, Texas and South Dakota. 2/

As stated previously, wheats may be divided into two types dependent upon time of seeding, winter and spring. In the United

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1/ Agricultural Statistics, 1938, op. cit., p. 9, Table 1.

2/ United States Department of Agriculture, Yearbook of Agriculture, 1933, p. 406, Table 4; and Agricultural Statistics, 1937, p. 12, Table 3.

States the acreage of winter wheat is considerably larger than that of spring wheat. In the five years 1925 to 1929 winter wheat acreage amounted to about 66 percent of the total acreage. In the same period production of winter wheat averaged 67 percent of the total.

The production of winter wheat is the most important in Kansas, Nebraska, Oklahoma, Texas, Illinois, Missouri, Ohio, Indiana, Washington and Colorado. Of the average total winter wheat acreage harvested in the 5 years 1928 to 1932, the acreage in these 10 states constituted about 79 percent, while production in the same states was 77 percent of the total. 1/ Winter wheat production is most important in the Central Great Plains area, the eastern portion of the North Central states and the Middle Atlantic states.

Spring wheat production is less widely distributed, concentrating to a large extent in the Northern Great Plains area. The important spring wheat states include North Dakota, South Dakota, Montana, Washington, Idaho, Colorado, Nebraska and Oregon; although smaller, less important areas, are found in Wyoming, Illinois, Wisconsin, Iowa, and Utah. The United States Department of Agriculture divides spring wheat into two groups, durum and spring wheat other than durum.

As indicated in the Grain Standards Act, there are five principal classes of wheat grown in the United States: hard red spring, soft red winter, hard red winter, durum, and white.

The class hard red spring is grown in practically all geographical divisions except the South Atlantic, but its production of importance

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1/ Agricultural Statistics, 1937, op. cit., p. 13, Table 4.

is concentrated in the North Central States. Although it has been the leading class of wheat in Maine, New Hampshire, Vermont and Wisconsin, its production is greatest in North Dakota, Minnesota, South Dakota, Wyoming and Montana. In 1924 this class of wheat was reported as grown in 30 states. 1/ During the period 1921 to 1937 the production of hard red spring averaged 136 million bushels, or 18 percent of the total production of all wheat (Table 25). This class ranks third in total production and is considered the strongest of the flour wheats.

With respect to total production, the most important class of wheat is hard red winter. This class is grown to some extent in all geographical divisions, but principally in the states of Kansas, Oklahoma, Nebraska, Colorado, Texas, Illinois, Washington and Montana. In 1924 it was the leading class of wheat in Utah, New Mexico and Iowa. 2/ In the same year the acreage of this class made up the following percentages of the total acreage of wheat in the succeeding states: 95 percent in Kansas, 93 percent in Nebraska, 86 percent in Oklahoma, and 86 percent in Iowa. The average production of hard red winter for the years 1921 to 1937 was 313 million bushels or 40 percent of the total production of all wheat (Table 25). This class produces a strong flour and is considered of good milling quality. While the class hard red spring is seldom exported in appreciable quantities, hard red winter usually constitutes a considerable portion of our total wheat exports.

1/ United States Department of Agriculture, Distribution of the Classes and Varieties of Wheat in the United States, Departmental Bulletin No. 1498, May, 1929.

2/ U. S. D. A. Departmental Bulletin No. 1498, op. cit., p. 66.

Based upon total production, the class soft red winter is next to hard red winter in importance. This class is grown in all geographical divisions. In 1924 it was the leading class of wheat in Pennsylvania, Rhode Island, New Jersey, Massachusetts, Delaware, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Ohio, Indiana, Michigan, Missouri, Kentucky, Tennessee, Alabama, Mississippi, Louisiana and Arkansas. 1/ The greatest acreage is found in Ohio, Indiana, Mississippi, Pennsylvania and Illinois. In 1924 this class occupied 98 percent of the total acreage devoted to wheat in Ohio, 87 percent in Indiana, 90 percent in Missouri, and 99 percent in Pennsylvania. The average production of soft red winter for the 17 years, 1921 to 1937, was 195 million bushels or 25 percent of the total production of all wheat (Table 25). Soft red winter wheat is usually not one of the chief classes exported.

The fourth ranking class is white wheat which is grown to some extent in all divisions, although principally in the far western division. In 1924 it was the leading class in New York, Connecticut, Arizona, Nevada, Washington, Idaho, Oregon, and California, but its production of importance is concentrated to a large extent in the states of Washington, Oregon and Idaho. In 1924 soft red winter occupied 90 percent of the total acreage devoted to wheat in New York, 96 percent in Arizona, 52 percent in Idaho, 52 percent in Washington, 65 percent in Oregon and 98 percent in California. 2/ During the

1/ U. S. D. A. Departmental Bulletin No. 1498, op.cit., p. 67.

2/ U. S. D. A. Departmental Bulletin No. 1498, op. cit., p. 66.

period 1921 to 1937 the production of this class of wheat averaged 83 million bushels or about 10.7 percent of the total production of all wheat (Table 25). White wheat is soft in texture, low in protein and quite high in moisture content. It has objectionable features when used in the preparation of bread flour. In years when we export an appreciable quantity of wheat, this class usually constitutes a considerable portion of the total.

The class of wheat designated as durum is the least important as regards quantity of production. Durum wheat is grown in the same general divisions and in most of the states where hard red spring is produced. In 1924 it was not the leading class in any state but most widely grown in North Dakota. The chief durum producing states are North Dakota, South Dakota, Minnesota and Montana. In 1924 this class of wheat occupied 32 percent of the total wheat acreage in North Dakota, 43 percent in South Dakota, 4 percent in Montana, and 8 percent in Minnesota. 1/ It is also grown to some extent in New Hampshire, Wyoming and Colorado. In the period 1921 to 1937 production of this class averaged 47 million bushels or 6 percent of the total production of all wheat (Table 25). Durum wheat has a relatively low moisture and protein content, and a hard texture. Considerable quantities of this class have been included in wheat exports in the United States in the past.

1/ U. S. D. A. Departmental Bulletin No. 1498, op. cit., p. 68.

CONCLUSIONS

Wheat prices fluctuate with the general price level, showing changes in the value of money. Deviations from the general level of prices are explained principally by factors associated with supply and demand.

During the period 1875 to 1891 the purchasing power of wheat remained practically stable. The price of wheat and the general price level declined. From 1897 to 1913 prices of commodities, including wheat, rose. The purchasing power of wheat in terms of all commodities remained practically stable.

Index numbers of the price of wheat in gold in Canada, the United States, Australia, England, and Argentina followed a similar course from 1923 or 1937 (crop years). Deviations from the level in five countries are explained chiefly by local supply and demand influences. During the years 1933, 1934 and 1935 short crops in the United States resulted in domestic prices above world levels.

Broad movements of the price of wheat in gold in five countries and the world price level of basic commodities were similar during the period 1923 to 1937. Supply and demand influences affecting world wheat explain the principal deviations from the world price level. Large supplies during 1929 to 1933 (crop year) depressed wheat prices below the world price level of basic commodities.

Re-valuation increased wheat prices in the United States, although prices were higher than could reasonably be expected from

increasing the price of gold. Local supply and demand conditions which increased domestic prices played an important part during the period of re-valuation.

Devaluation of the Canadian dollar, the Argentine peso, and the Australian and English pounds increased wheat prices in currency at terminal markets in those countries above the level in gold in five countries.

During the period 1921 to 1937, as measured by gross linear correlation, the association of Liverpool prices to the world supply of wheat was greater than Kansas City prices.

In the same period the association of Kansas City prices, deflated by index numbers of the prices of all commodities, with the world supply of wheat was slightly greater than that between Kansas City prices deflated by basic commodities and world supply.

During the period 1921 to 1937 Minneapolis prices of No. 1 Dark Northern Spring wheat were more highly correlated with Liverpool prices than Kansas City prices of No. 2 Hard Winter wheat.

Minneapolis prices were more highly correlated with the world supply of wheat than Kansas City prices.

During the period 1921 to 1937 Liverpool prices were more highly correlated with world supply than world production.

In the same period Kansas City prices were also more highly correlated with world supply than world production.

Kansas City prices were more closely associated with Minneapolis prices than Liverpool prices, although less than the association between Minneapolis prices and Liverpool prices.

A small supply of wheat has a more striking affect on prices than a large supply.

From 1925 to 1937 a world supply of wheat 10 percent above normal was accompanied by lower prices at Kansas City than at Liverpool.

A given world production of wheat had a greater influence on Kansas City prices during the period 1925 to 1937 than during the period 1899 to 1913.

A world crop of wheat 10 percent below normal had a more striking affect on prices at Kansas City than at Liverpool.

During the period 1925 to 1937 a given size world supply of wheat had more influence on prices at Kansas City than a proportionate United States supply. A world crop 10 percent above normal lowered prices at Kansas City more than a United States crop 10 percent above normal.

From 1925 to 1937 a United States supply of wheat 20 percent above normal lowered farm prices in North Dakota (surplus area) more than in Georgia (deficit area).

A United States supply of wheat 20 percent below normal had a more striking affect on the June price of No. 1 Dark Northern Spring wheat at Minneapolis than a supply 20 percent above normal.

A Northern Hemisphere crop 10 percent above normal was accompanied by a spring to fall change in price at Liverpool 21 percent below normal. A 10 percent below normal crop was accompanied by a change of 29 percent above normal.

Price differences among the classes of wheat in the United States can be explained to large extent by variations in the production of each class.

Seasonality of Minneapolis prices are similar to Kansas City prices, except during the months of August and September when Minneapolis prices tend to be depressed more than Kansas City prices.

During the period 1923 to 1937 a given United States supply of wheat had a greater influence on Minneapolis wheat prices than flour prices.

The price of wheat fluctuates more violently than the price of flour, while the price of flour in turn fluctuates more violently than the retail price of bread.

From 1923 to 1937 the Minneapolis prices of Standard middlings and bran moved more closely with the price of wheat than Spring Patent flour.

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STATISTICAL APPENDIX

Table 1.- Index Numbers of the Price of Gold in Australia, By Months, 1920-1921 to 1937-1938

Crop year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Crop year average 1/
1920	127.1	135.6	139.9	141.8	144.5	142.8	133.3	128.8	127.5	127.0	125.5	131.9	133.8
1921	137.4	136.5	134.8	128.8	125.6	119.9	117.8	113.9	113.2	111.9	110.9	110.7	121.7
1922	110.6	110.0	110.5	110.8	108.9	105.9	104.9	104.0	103.9	104.8	105.4	105.8	107.0
1923	106.4	107.0	107.5	107.8	111.4	111.9	114.1	112.4	112.3	110.7	110.0	110.9	110.2
1924	109.7	106.5	107.2	106.0	103.0	101.0	99.2	99.4	99.4	99.0	100.0	100.0	102.5
1925													100.0
1926													100.0
1927													100.0
1928	101.1	101.3	101.3	101.3	101.4	101.3	101.3	101.3	101.3	101.3	101.3	101.4	101.3
1929	101.4	101.7	101.9	101.6	101.6	101.6	102.2	102.9	104.6	106.6	106.6	106.7	103.3
1930	106.5	106.4	106.6	108.6	109.2	109.2	120.6	130.8	130.8	130.6	130.6	130.5	118.4
1931	130.8	130.8	140.2	163.3	170.8	181.1	178.8	176.8	167.8	162.8	166.2	167.6	161.3
1932	172.2	175.8	176.0	179.8	186.5	186.2	181.6	178.5	178.0	178.6	182.5	181.2	179.7
1933	183.3	186.8	194.2	194.5	189.9	186.8	192.2	205.5	202.9	200.6	202.6	204.9	195.3
1934	205.1	204.1	207.1	209.3	207.3	209.1	211.4	212.3	216.6	213.8	211.6	209.5	209.8
1935	208.5	208.1	209.7	210.8	210.0	209.7	208.3	206.7	208.1	209.1	208.1	206.1	208.6
1936	205.9	205.7	205.3	211.8	211.6	210.8	210.8	211.2	211.2	209.9*	208.9	209.1	209.3
1937	207.8	207.2	208.4	208.4	206.6	206.6	206.5	205.7	207.1	207.2	207.8	208.2	207.3

1/ Simple average calculated by the writer.

* Beginning March, 1936, monthly data calculated by the writer. Index numbers were obtained by dividing the par rate of exchange ($4.8666) by the monthly average exchange rates at New York City as compiled in the monthly Federal Reserve Bulletins, and multiplying the results by the monthly premium for gold in the United States of 69.3 percent.

Source: Warren, G. F., and Pearson, F. A. World Prices and the Building Industry, 1937, page 192.

Table 2.- Index Numbers of the Price of Gold in Argentina, By Months, 1920-1921 to 1937-1938

Crop year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Crop year average 1/
1920	104.6	110.8	114.1	118.6	125.5	122.5	121.5	120.0	123.4	130.4	134.3	138.1	122.0
1921	146.6	145.0	138.6	132.0	131.3	129.0	125.0	116.8	116.5	119.5	117.1	117.8	127.9
1922	117.9	117.5	119.0	118.5	117.3	112.7	113.8	114.6	114.6	116.0	118.1	119.9	116.6
1923	124.1	129.6	126.9	131.0	135.6	133.4	131.0	126.2	126.0	129.0	129.3	130.6	129.6
1924	130.2	125.8	120.6	115.5	112.8	109.2	105.9	106.8	107.5	111.0	106.9	105.6	113.1
1925	105.2	105.2	105.2	103.3	102.2	102.4	102.5	103.4	106.8	106.3	105.7	105.2	104.4
1926	104.8	104.9	104.6	104.0	104.4	103.4	102.8	101.8	100.5	100.3	100.3	100.0	102.6
1927	99.9	99.6	99.3	99.3	99.4	99.2	99.4	99.3	99.2	99.3	99.3	99.5	99.4
1928	100.4	100.6	100.8	100.9	100.7	100.8	100.8	100.8	101.0	101.0	101.0	101.2	100.8
1929	101.2	101.1	101.2	101.6	102.7	103.7	105.6	111.5	112.6	108.8	110.6	114.2	106.2
1930	117.6	117.0	118.0	123.6	123.5	127.7	138.4	134.1	123.6	126.2	136.4	137.3	126.9
1931	138.6	149.4	161.6	185.5	164.0	164.9	165.6	165.7	165.5	165.7	165.4	164.9	163.1
1932	164.8	164.8	164.7	164.7	164.7	164.7	164.7	164.7	165.5	166.8	167.9	166.6	165.4
1933	166.7	166.6	166.4	166.4	167.8	199.2	201.4	214.2	211.6	209.2	211.2	213.5	191.2
1934	213.8	213.8	215.8	218.0	216.4	218.0	220.4	223.4	226.0	223.1	220.8	218.6	218.8
1935	217.6	217.0	218.7	219.8	218.9	218.7	217.4	215.7	216.9	218.0	217.0	215.0	217.6
1936	214.7	214.5	213.8	219.9	220.6	219.6	219.6	220.2	220.6	219.2	218.2	218.4	218.3
1937	217.0	216.4	217.7	217.6	215.7	215.7	215.7	214.8	216.2	216.4	217.0	217.4	216.5

1/ Simple Average.

Index numbers were obtained by dividing the par rate of exchange (paper peso 42.45¢), (gold peso, 96.48) by the monthly average exchange rates at New York City, as compiled in Table 39, and beginning April, 1933, multiplying the results by the monthly indexes of the price of gold in the United States as given in Table 5.

Table 3.- Index Numbers of the Price of Gold in England, By Months, 1920-1921 to 1937-1938

Crop year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Crop year average 1/
1920	127.7	134.6	139.5	138.9	140.7	137.7	127.0	124.5	123.7	123.3	123.2	129.0	130.8
1921	134.5	130.9	131.0	124.3	121.6	115.4	114.2	111.1	112.6	109.9	109.5	109.4	118.7
1922	109.1	108.6	110.0	109.1	107.9	104.4	104.5	103.6	104.1	104.5	104.8	105.5	106.3
1923	105.7	106.4	106.8	107.8	111.9	111.7	114.3	113.0	113.1	111.3	112.0	112.3	110.5
1924	110.7	107.6	109.1	108.2	105.6	104.1	102.5	102.4	101.8	100.0	100.0	100.0	104.4
1925													100.0
1926													100.0
1927													100.0
1928													100.0
1929													100.0
1930													100.0
1931	100.0	100.0	111.9	125.9	133.8	141.8	139.6	140.3	138.3	131.0	133.0	133.9	126.9
1932	137.5	139.6	140.8	144.3	149.9	146.6	144.2	143.1	143.1	142.1	145.2	143.9	143.8
1933	145.9	148.8	154.6	154.8	151.5	148.6	153.8	161.2	160.2	159.1	160.4	162.1	155.0
1934	168.3	163.1	165.8	166.7	164.2	165.5	166.9	168.8	172.7	169.8	167.8	166.3	166.6
1935	165.8	165.1	165.9	166.7	166.3	166.1	165.9	165.9	166.8	168.7	166.9	163.3	165.6
1936	163.5	162.9	162.4	167.1	167.5	166.8	166.8	167.3	167.6	166.3	165.5	166.9*	165.9
1937	166.9	165.4	166.4	166.2	164.9	166.9	168.1	164.2	165.2	165.4	165.9	166.2	165.6

1/ Simple average, calculated by the writer.

* Beginning June, 1936, monthly data calculated by the writer. Index numbers were obtained by dividing the par rate of exchange ($4.86) by the monthly average exchange rates at New York City, as compiled in the monthly Federal Reserve Bulletins, and multiplying the results by the monthly premium for gold in the United States of 69.3 percent.

Source: Warren, G. F., and Pearson, F. A. World Prices and the Building Industry, 1937, page 181.

Table 4.- Index Numbers of the Price of Gold in Canada, By Months, 1920-1921 to 1937-1938

Crop year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Crop year average 1/
1920	113.5	112.8	110.7	110.1	112.0	115.9	114.1	113.5	113.9	112.3	111.5	112.7	112.7
1921	113.4	111.4	111.3	109.4	109.3	107.8	105.5	103.8	103.2	102.3	101.2	101.2	106.6
1922	101.0	100.3	100.1	99.9	100.0	105.9	100.9	101.3	102.0	102.0	102.1	102.4	101.5
1923	102.6	102.4	102.4	101.5	101.9	102.5	102.7	103.2	103.1	102.0	101.7	101.6	102.3
1924	100.8	100.1	100.1	100.0	100.0	100.3	100.3	100.1	100.1	100.1	100.0	100.0	100.2
1925	100.0	100.0	100.0	99.9	99.9	100.0	100.2	100.3	100.4	100.0	99.9	99.9	100.0
1926	99.9												100.0
1927													100.0
1928													100.0
1929													100.0
1930													100.0
1931	100.0	100.0	103.9	112.2	112.4	120.9	117.5	114.6	111.8	111.3	113.1	115.3	111.1
1932	114.9	114.2	118.8	109.6	114.5	115.5	114.3	119.7	119.7	123.4	134.2	136.4	118.9
1933	147.7	145.5	153.9	152.3	158.2	155.5	159.8	170.7	169.6	169.0	169.0	167.9	159.9
1934	167.3	165.4	164.6	165.7	165.2	167.1	169.0	169.5	170.8	170.1	169.5	169.5	167.8
1935	169.6	169.6	170.5	171.7	171.2	171.8	169.5	169.1	169.6	170.1	169.6	169.8	170.1
1936	169.5	169.3	169.3	169.3	169.1	169.2	169.3	169.3	169.1	169.1	169.1*	169.3	169.2
1937	169.5	169.3	169.3	169.3	169.1	169.3	169.3	169.3	169.6	170.1	170.6	171.3	169.7

1/ Simple average, calculated by the writer.

* Beginning May, 1936, monthly data calculated by the writer. Index numbers were obtained by dividing the par rate of exchange (1.00) by the monthly average exchange rates at New York City, as compiled in the monthly Federal Reserve Bulletins, and multiplying the results by the monthly premium for gold in the United States of 69.3 percent.

Source: Warren, G. F., and Pearson, F. A. World Prices and the Building Industry, 1937, page 181.

Table 5.- Index Numbers of the Price of Gold in the United States, By Months, 1932-1933 to 1937-1938

Crop year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Crop year 1/ average
1932	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	104.6	117.5	122.7	103.7
1933	139.5	137.1	148.4	160.1	156.4	159.0	169.3	169.3	169.3	169.3	169.3	169.3*	159.7

1/ Simple average, calculated by the writer.

* By the Gold Reserve Act of 1934, approved January 30, 1934. An executive order set the weight of the dollar at 15 5/21 grains of gold nine-tenths fine, or an equivalent of $35 per ounce, which is an index of 169.3 when the pre-war price of $20.67 equals 100.

Source: Warren, G. F., and Pearson, F. A. World Prices and the Building Industry, 1937, page 179.

Table 6.- Wheat, No. 3 Northern Manitoba: Average Spot Price Per Bushel, Winnipeg, By Months, 1910-1911 to 1914-1915 and 1920-1921 to 1937-1938

Crop year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Average
	Can. Cts.	Can. Cts.	Can. Cts.	Can. Cts.	Can. Cts.	Can. Cts.	Can. Cts.	Can. Cts.	Can. Cts.	Can. Cts.	Can. Cts.	Can. Cts.	Can. Cts.
1910	102.5	101.9	96.6	89.8	85.5	84.0	88.3	85.5	84.9	86.0	90.1	90.4	90.4
1911	90.6	95.5	95.4	94.4	90.2	84.8	87.5	89.4	91.0	95.7	96.7	99.8	92.6
1912	99.0	99.7	90.6	86.6	78.1	74.0	76.5	78.5	79.6	85.0	87.0	90.1	85.4
1913	89.0	88.1	82.3	77.0	79.8	77.9	80.9	85.4	87.1	86.4	90.7	89.4	84.5
1914	86.7	102.9	104.6	103.6	111.0	111.0	130.7	148.3	144.1	152.7	152.5	121.4	122.5
1920	256.0*	261.3*	266.0	222.4	200.3	185.9	184.8	181.5	183.8	167.2	178.2	180.6	205.7
1921	176.8	167.3	138.7	109.1	102.0	101.1	100.1	122.2	127.6	129.2	131.5	118.6	127.0
1922	121.5	107.6	95.2	95.6	105.1	104.1	104.4	106.7	107.5	115.6	113.0	110.3	107.2
1923	101.6	105.0	98.6	90.8	89.1	85.0	88.8	92.6	90.8	91.0	94.0	107.0	94.5
1924	127.1	134.7	135.6	150.3	153.1	161.5	184.5	186.9	166.9	148.8	174.2	161.9	157.1
1925	153.4	139.8	131.9	120.0	135.5	149.0	146.0	144.4	137.6	145.7	144.4	143.9	142.6
1926	149.4	138.1	133.0	136.0	131.2	123.0	123.1	126.9	130.4	132.6	146.4	149.3	135.0
1927	153.0	144.7	131.0	126.8	124.4	123.5	122.6	124.0	130.6	141.2	141.6	129.9	132.8
1928	119.9	107.6	106.5	111.0	111.2	108.7	112.4	119.7	119.2	115.0	106.8	112.4	112.5
1929	152.2	151.8	143.7	133.7	126.2	130.3	122.6	109.6	99.5	103.4	103.7	98.4	122.9
1930	90.3	88.0	74.1	67.8	59.6	48.4	47.4	53.2	50.0	53.7	53.0	52.7	61.5
1931	49.1	46.0	44.7	50.2	58.6	52.0	51.2	54.8	55.1	55.1	55.6	49.2	51.8
1932	49.8	52.2	48.1	45.3	43.5	37.6	40.0	42.2	45.7	50.8	60.2	63.5	48.2
1933	78.7	69.4	63.2	55.8	59.2	54.4	59.4	61.7	62.0	61.0	65.0	71.1	63.4
1934	77.1	81.2	77.1	71.9	73.1	72.6	71.8	72.1	74.7	80.5	78.0	73.8	75.3
1935	73.4	76.4	83.3	83.2	78.3	76.9	78.7	75.8	75.5	74.6	70.9	73.4	76.7
1936	88.1	97.4	99.7	106.5	104.4	115.2	120.3	121.1	130.2	132.9	125.6	119.6	113.4
1937	139.0	121.9	121.1	117.4	110.6	116.4	121.4	121.4	114.4	116.4	106.5	104.8	117.6

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Table 6.- Wheat, No. 3 Northern Manitoba: Average Spot Price Per Bushel, By Months, 1910-1911 to 1914-1915 and 1920-1921 to 1937-1938 - (Cont'd.)

Compiled as follows:

July 1910 - June 1915	Winnipeg Farmers Advocate.
July 1920 - June 1921	Annual reports of the Winnipeg Grain Exchange.
July 1921 - July 1928	Reports on the Grain Trade of Canada, Winnipeg, annual.
August 1928	Minneapolis Daily Market Record.

Monthly prices are averages of daily cash closing quotations, in store at Fort William and Port Arthur.

* Canadian Government established fixed price for wheat in Canada from September 12, 1917 to August 17, 1920.

Supplied through the courtesy of the Division of Statistical and Historical Research, Bureau of Agricultural Economics, United States Department of Agriculture, Washington, D. C.

Table 7.- Wheat, milling: Average Wholesale Price Per Bushel of 60 Pounds, Sydney, Australia, By Months, 1909-1910 to 1914-1915 and 1920-1921 to 1937-1938

Crop year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
1909-1910	5/4	5/6.5	4/10	4/10	4/11.5	4/1	4/3	4/1.8	4/1	4/1	3/8.2	3/4
1910-1911	3/7.8	3/10.2	3/10	3/9	3/8	3/8	3/7.8	3/5	3/3	3/5.2	3/4.2	3/3.2
1911-1912	3/3.8	3/6.5	3/7.5	3/7.8	3/8	3/7.5	3/9	3/9.2	3/8.5	4/-	4/4	4/3.5
1912-1913	4/1.5	4/3.5	4/4.8	4/6.2	4/3.5	3/7	3/6.5	3/6.2	3/7	3/8.2	3/8	3/7.5
1913-1914	3/6.9	3/7.2	3/7	3/6.8	3/5.8	3/5.8	3/5.8	3/8	3/9.2	3/9.2	3/10	3/10.2
1914-1915	3/10.5*	4/4.2	4/6	4/4	4/6	5/6	5/6	5/6	5/6	5/6	5/6	5/6
1920-1921	8/10	8/10	8/10	8/10	8/11	9/-	9/-	9/-	9/-	9/-	9/-	9/-
1921-1922	9/.**	9/-	9/-	9/-	9/-	4/11	4/11	5/2	5/11	5/8	5/11	5/11
1922-1923	5/10	5/8	5/8	5/8	5/8	6/-	5/11.2	5/8.1	5/6.9	5/7	5/9.8	5/7.5
1923-1924	5/3	4/10.7	4/10	4/10	4/10	4/6.5	4/7.5	4/7.3	4/7	4/10	4/11	4/11.5
1924-1925	5/7.7	6/1.5	6/0.5	6/6.8	6/3.3	6/3.4	6/8	6/9.3	6/3.8	5/10.3	6/2	6/2.5
1925-1926	5/11	6/2.5	6/2	5/10	5/11	6/2	6/1	5/11.8	5/8.8	6/1.8	6/2.8	6/3.3
1926-1927	6/7	6/10.5	6/9.2	6/4.2	5/6.9	5/3	5/3.2	5/1.4	5/0.7	5/5.5	5/5.7	5/6.3
1927-1928	5/5.5	5/6.4	5/8.4	5/1	5/3.9	5/3.8	5/4.8	5/2.9	5/3.4	5/6.8	5/7.4	5/5.1
1928-1929	5/3.8	4/9.8	4/7.8	4/7.9	4/8.0	4/7.5	4/7.3	4/8.3	4/7.6	4/6.8	4/4.1	4/3.3
1929-1930	5/1.9	5/4.1	5/5.3	5/3.3	5/0.4	5/2.8	5/2.1	4/8.4	4/5.0	4/7.5	4/6.0	4/3.7
1930-1931	3/10.3	3/9.4	3/1.7	2/8.5	2/7.2	2/4.9	2/2.0	2/1.8	2/1.7	2/3.2	2/6.1	2/3.5
1931-1932	2/2.9	2/1.9	2/1.7	2/7.5	3/4.2	3/2.4	3/1.5	3/2.0	3/0.9	3/1.2	3/2.2	3/0.2
1932-1933	3/0.1	3/2.8	3/3.8	3/0.3	2/10.7	2/8.5	2/9.2	2/8.4	2/9.2	2/9.9	3/0.9	3/2.0
1933-1934	3/4.1	3/1.7	2/11.5	2/5.8	2/7.8	2/7.3	2/6.5	2/5.3	2/6.2	2/6.4	2/6.9	2/9.1
1934-1935	2/10.8	3/3.2	2/11.6	2/8.3	2/5.7	2/7.7	2/10.5	2/11.7	3/1.1	3/4.1	3/3.2	3/1.1
1935-1936	2/11	3/1	3/4.4	3/6.9	3/5.3	3/6.1	3/9.3	3/7.1	3/7.9	3/8.7	3/8.2	3/6.8
1936-1937	3/11.4	4/7.7	4/7.8	4/11	4/9.9	5/3.8	5/1.4	5/0.6	5/4.7	5/4.9	5/3	5/1
1937-1938	5/5	5/1	5/0	5/0	4/7	4/5.5	4/5.5	4/5.5	4/1.5	4/0	3/10.5	3/7

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Table 7.- Wheat, millings Average Wholesale Price Per Bushel of 60 Pounds, Sydney, Australia, By Months, 1909-1910 to 1914-1915 and 1920-1921 to 1937-1938 (Continued)

Compiled as follows:

Jan. 1892 - June 1931 - Statistical Register of New South Wales.
July 1931 - New South Wales Statistical Bulletin, (quarterly).

No description given as to how monthly averages are computed.

* Official price on trucks of wheat for home consumption.

** The price quoted is 1 3/4 pence below f.o.b.

Supplied through the courtesy of the Division of Statistical and Historical Research, Bureau of Agricultural Economics, United States Department of Agriculture, Washington, D. C.

Table 8.- Wheat, No. 2, semi-hard: Average Spot Price Per 100 Kilograms, Buenos Aires, By Months, 1912 to 1914 and 1920-1921 to 1937-1938

Crop year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Average
	$ m/n	$ m/n	$ m/n	$ m/n	$ m/n	$ m/n	$ m/n	$ m/n	$ m/n	$ m/n	$ m/n	$ m/n	$ m/n
1911-12							8.74	8.64	8.62	8.87	8.29	8.56	
1912-13	8.56	8.73	8.82	8.73	8.30	7.95	7.86	8.57	8.00	8.55	8.22	8.84	
1913-14	8.87	8.81	9.34	8.99	9.42	8.29	8.28	8.55	8.46	8.24	8.79	8.61	
1914-15	8.78	10.31	10.11	9.56	10.49	10.25							
1920	25.71	23.90	24.71	26.68	27.50*	-	18.21**	16.79	17.55	16.54	17.24	18.04	21.17***
1921	18.39	18.48	17.68	14.14	12.83	12.39	11.20	12.75	13.31	13.42	13.25	12.31	14.18
1922	12.98	12.15	11.95	12.53	12.21	11.93	11.88	11.97	11.86	12.09	11.88	11.77	12.10
1923	11.29	11.27	11.77	12.38	13.25	12.14	11.24	10.62	10.65	10.96	11.41	12.36	11.61
1924	14.60	15.30	14.98	15.86	15.62	15.37	16.78	17.38	16.71	15.74	16.07	15.28	15.81
1925	14.82	15.30	13.92	13.44	14.49	16.41	16.35	15.70	14.68	15.20	14.83	14.73	14.99
1926	14.48	14.51	14.42	14.68	13.94	12.05	11.48	11.90	11.51	11.56	12.62	12.70	12.95
1927	12.73	12.67	12.30	12.07	11.93	11.33	11.31	11.11	11.38	12.03	12.36	11.77	11.92
1928	11.41	10.47	10.26	10.47	10.24	9.77	9.88	10.07	9.95	9.70	8.98	8.80	10.00
1929	10.74	10.76	10.69	10.69	10.98	11.15	11.31	10.96	10.44	10.60	10.46	10.33	10.73
1930	9.95	9.94	8.91	8.19	7.86	6.82	6.19	6.13	6.38	5.91	6.81	6.81	7.17
1931	5.84	5.78	5.94	7.14	7.44	6.53	6.26	6.67	6.95	7.02	7.16	6.79	6.63
1932	6.64	7.05	7.05	6.74	6.15	5.72	5.57	5.37	5.38	5.68	5.89	5.92	6.10
1933	6.64	6.35	6.02	5.42	5.44	5.55	5.75	5.75	5.75	5.75	5.76	6.20	5.86
1934	6.59	8.01	7.31	6.42	6.35	6.46	6.38	6.38	6.64	7.40	7.25	6.94	6.84
1935	6.87	7.35	8.55	8.94	8.16	9.56	10.18	10.02	10.08	10.02	10.00	10.00	9.14
1936	10.83	11.83	10.99	11.34	10.73	11.14	10.96	11.26	12.66	13.89	13.89	13.99	11.87
1937	14.13	13.91	14.40	16.16	13.68	11.67	12.08	11.92	11.29	10.93	10.04	9.15	12.45

———continued

Table 8.- Wheat, No. 2, semi-hard: Average Spot Price Per 100 Kilograms, Buenos Aires, By Months, 1912 to 1914 and 1920-1921 to 1937-1938 (continued)

Compiled from Revista de la Bolsa de Cereales, Buenos Aires, weekly.

Monthly averages of daily official market prices in car on dock for merchandise of export grade described as follows:

January 1, 1920 - July 27, 1934, Barletta, for Brazil and/or consumption.
July 28, 1934 - December 28, 1935, Brazil.
January 3, 1936 , No. 2, semi-hard.

Grade of wheat given as 80 kilograms per hectoliter, October 30, 1926 - January 8, 1938; 78 kilograms per hectoliter, January 9, 1938.

* Average of 2 quotations.
** Average of 13 quotations (January 17-31)
***Average for months shown.

This price series was not found available prior to January 1912. The prices from January 1912 to December 1914 were obtained in United States cents per bushel from Yearbook Separate No. 881, Statistics for Grain Crops, 1922, page 604, United States Department of Agriculture. The prices in cents per bushel were converted into pesos per 100 kilograms by using, $\frac{\text{Quotation in U.S. Currency X 3.67431}}{\text{current exchange rate (monthly)}}$ = $ m/n per 100 kilograms.

The exchange rates used are given in Table 39.

Supplied through the courtesy of the Division of Statistical and Historical Research, Bureau of Agricultural Economics, United States Department of Agriculture, Washington, D. C.

Table 9.- Wheat, parcels 1/: Average Spot Price Per Quarter of 480 Pounds of Imported Wheat, Liverpool, By Months, 1910 to 1914 and 1920-1921 to 1937-1938

Crop year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Average
	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.
1909-10							39.096	38.126	38.392	37.362	34.126	32.210	
1910-11	32.935	35.541	34.511	33.539	32.237	32.263	33.580	32.881			31.882	32.237	
1911-12	31.566	31.908	32.868	33.511	32.526	33.196	34.783	35.439	38.064	39.064	38.424	38.720	
1912-13	38.833	35.439	35.855	36.199	34.582	33.937	34.797	34.426	35.395	35.796	34.840	34.483	
1913-14	33.498	32.881	31.934	31.605	32.277	32.592	31.908	31.947	33.896	33.840	34.412	33.743	
1914-15	31.673	38.291	39.471	39.471	39.482	43.517	57.929						
1920-21	91.620	93.592	93.287	103.635	113.290	102.976	99.369	83.250	84.273	77.511	77.476	72.971	91.101
1921-22	70.333	70.270	65.694	53.300	49.931	50.617	49.414	55.675	55.920	54.476	54.433	50.690	56.734
1922-23	51.041	46.265	44.063	48.400	48.883	48.855	47.368	46.270	45.982	48.360	47.928	45.558	47.408
1923-24	42.862	41.960	41.869	42.725	43.409	43.019	45.458	46.216	44.598	43.989	44.459	46.593	43.930
1924-25	51.597	53.888	55.485	61.995	61.192	62.331	66.692	68.660	64.268	56.831	60.708	58.692	60.192
1925-26	55.442	56.715	52.492	49.051	54.249	60.943	59.383	57.584	52.878	56.193	56.923	55.488	55.608
1926-27	54.898	53.387	52.472	56.333	56.197	53.735	52.667	51.637	51.118	51.264	54.114	54.306	53.507
1927-28	53.074	52.490	49.619	49.108	48.315	48.506	49.136	47.954	49.654	52.289	50.983	48.301	49.949
1928-29	46.282	41.364	41.358	42.286	42.369	41.528	42.952	44.301	43.209	41.079	38.034	38.385	41.929
1929-30	46.278	46.727	45.174	44.781	41.891	46.287	45.966	40.962	38.635	39.476	37.690	36.123	42.492
1930-31	34.291	34.721	30.050	28.192	26.505	24.178	22.401	23.879	22.041	23.243	23.725	21.880	26.192
1931-32	20.397	17.346	18.703	23.981	28.792	27.251	26.137	27.749	27.965	27.167	26.704	24.007	24.683
1932-33	24.305	26.413	27.291	25.784	25.380	23.730	23.891	22.883	22.138	23.104	24.839	24.258	24.435
1933-34	27.257	23.904	24.986	20.732*	21.219	20.465	21.969	21.038	21.042	21.111	20.895	21.276	22.158*
1934-35	24.154	29.664	27.480	24.832	24.383	26.135	25.600*	24.965*	26.875	26.477*	27.493*	25.612	26.139*
1935-36	26.012*	27.677*	29.597*	32.143*	28.041*	30.230*	31.990*	29.261	29.748	28.837*	27.953	27.396**	29.074*
1936-37	31.828*	36.701*	36.090*	38.980*	37.665*	41.920	43.163	40.855	44.592	48.776	45.806	43.244*	40.802*
1937-38	46.108	43.295	43.932*	44.304*	43.285	44.944*	38.201	41.646	35.252	34.598	31.879	32.499	39.995*

———continued

Table 9.- Wheat,parcels: Average Spot Price Per Quarter of 480 Pounds of Imported Wheat, Liverpool, By Months, 1910 to 1914 and 1920-1921 to 1937-1938 - (continued)

Compiled from Broomhall's Corn Trade News, Liverpool, daily.
Monthly prices are simple averages of daily sales prices of parcels at Liverpool; annual prices are simple averages of monthly averages.

1/ Parcels are less than cargo lots. Mark Lane deals in parcels ranging from 8,000-40,000 bushels.
* Excluding a few "on sample" prices from France, Sweden, South Russia, Canada, Danube Basin, Poland or Rhodesia (Germany for Oct. 1933).
**Excluding a quotation of No. 6 Manitoba Van - inferior grade (21.125) shillings per quarter.

The series called Imported Parcels was not found available prior to January 1920. The 1910-1914 average was determined by adjusting the price in United States cents per bushel of good average quality red wheat at Liverpool for the period 1910-1914 to parcel basis and converting into shillings per quarter of 480 pounds. The average corresponding monthly difference was calculated for each month for the period 1920-1929, when both series, imported parcels and good average quality red, were available. This average difference for each month was subtracted from the monthly price of good average quality red. The resulting adjusted price per bushel of good average quality red was then converted into shillings per quarter of 480 pounds by the formula.

$$\text{Liverpool quotations in shillings per quarter} = \frac{\text{U. S. Quotations in Cents per bushel}}{(.125)\ (\text{Exchange rate in shillings})}$$

The monthly exchange rates used were those compiled by Division of Statistical and Historical Research, Bureau of Agricultural Economics, from "European Currency and Finance" Foreign Currency and Exchange Investigation, Serial 9, Volume 1, p. 452. The monthly rates of exchange from January 1910 - December 1913 are average rates for sight drafts in New York. The above explanation was prepared by the writer.

Supplied through the courtesy of the Division of Statistical and Historical Research, Bureau of Agricultural Economics, United States Department of Agriculture, Washington, D. C.

Table 10.- Average Spot Price Per Bushel of No. 2 Hard Winter Wheat, at Kansas City, By Months, 1909-1910 to 1914-1915 and 1920-1921 to 1937-1938

Crop year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Weighted 1/ Average
	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	
1909-10	114	102	102	106	104	110	111	111	110	108	107	108	107
1910-11	104	100	99	95	91	93	95	90	88	88	90	88	98
1911-12	87	93	95	104	100	100	105	103	105	109	111	109	97
1912-13	92	89	88	88	83	84	87	86	86	88	87	88	88
1913-14	82	83	87	84	83	84	85	86	88	87	90	85	84
1914-15	78	91	104	102	108	113	134	154	149	154	150	121	105
1920	266	245	244	207	176	169	172	162	155	133	147	138	183
1921	118	115	122	110	109	109	113	129	134	135	134	117	120
1922	113	104	104	113	117	117	114	115	116	120	116	104	113
1923	96	101	109	112	109	109	113	111	109	104	106	108	105
1924	120	119	120	137	143	162	182	181	171	151	163	160	135
1925	154	164	158	158	163	172	178	171	161	159	155	153	163
1926	137	131	132	139	137	138	137	135	133	131	142	144	135
1927	136	135	131	128	131	132	133	133	138	152	160	147	135
1928	120	106	107	110	112	111	114	118	116	110	101	105	112
1929	125	123	124	122	119	121	119	113	102	101	99	89	120
1930	80	81	78	74	69	71	69	69	70	73	73	68	76
1931	44	43	43	48	59	52	53	54	51	53	54	46	47
1932	45	48	48	45	43	42	44	44	48	60	70	76	51
1933	98	90	87	83	84	80	84	85	82	78	86	89	88
1934	93	107	108	102	102	104	101	100	97	105	99	88	98
1935	99	104	115	119	113	111	113	110	106	102	95	96	105
1936	111	122	122	122	122	134	138	136	139	140	132	121	121
1937	122	112	110	106	94	96	103	100	92	85	80	77	-

1/ Computed by weighting selling price by number of carlots.

Source: Original, Kansas City Grain Market Review. Secondary, Bureau of Agricultural Economics, compiled as follows: Crop years, 1920-1925, 1928 Yearbook of Agriculture, Table 22.
1926-1935, Agricultural Statistics, 1937, Table 18.
1936-1937, Crops and Markets, Volume 15, Number 4, 6 and 8.

Table 11.- Index Numbers of the Average Spot Price of No. 3 Manitoba Northern Wheat at Winnipeg, in Canadian Currency, By Months, 1920-1921 to 1937-1938 1/

(1910-1914 = 100)

Crop year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Average 2/
1920	274	267	283	246	225	215	214	209	208	185	195	198	227
1921	189	171	148	121	115	117	116	140	144	143	145	130	140
1922	130	110	101	106	118	120	120	123	122	129	124	121	119
1923	109	107	105	101	100	98	103	107	103	101	103	117	104
1924	136	138	145	166	178	188	213	214	188	165	191	177	174
1925	164	164	140	133	153	172	169	165	156	162	158	158	158
1926	139	141	142	151	147	142	142	146	147	147	160	163	149
1927	144	148	139	141	139	144	142	142	148	156	156	142	147
1928	128	130	113	123	125	126	130	138	134	128	117	123	124
1929	162	155	153	149	142	151	142	126	113	114	114	107	136
1930	96	90	79	75	67	57	54	61	56	60	58	58	68
1931	58	47	48	55	66	60	59	63	62	61	61	54	57
1932	53	53	51	50	49	44	46	48	52	56	66	70	53
1933	84	71	67	62	66	62	68	71	70	68	71	78	70
1934	82	83	82	88	82	84	83	83	85	90	86	81	83
1935	78	78	88	98	86	89	91	87	86	83	78	80	85
1936	94	99	106	118	117	133	139	139	147	147	138	132	126
1937	123	125	129	130	125	134	140	139	129	129	116	115	130

1/ Calculated on a corresponding month basis, January 1910 to December 1914 equals 100.

2/ Simple average of monthly index numbers.

Table 12.- Index Numbers of the Average Price Per Bushel of Milling Wheat at Sidney, in Australian Currency, By Months, 1920-1921 to 1937-1938 1/

(1910-1914 = 100)

Crop year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Average 2/
1920	238	224	222	223	227	227	241	243	242	237	238	243	234
1921	243	228	226	227	230	124	132	139	159	149	157	160	181
1922	157	144	142	143	144	151	159	153	151	147	154	152	150
1923	142	124	128	122	123	114	124	124	124	127	130	134	126
1924	152	155	152	164	160	158	178	183	172	155	163	167	163
1925	160	157	155	147	151	155	163	161	156	162	165	169	158
1926	178	174	170	160	142	136	141	138	137	144	145	149	151
1927	147	140	143	128	140	138	145	139	148	147	149	146	142
1928	143	122	117	118	119	116	123	126	126	120	115	115	122
1929	139	136	136	133	128	132	139	127	120	122	119	116	129
1930	104	96	79	68	66	61	98	98	98	60	66	62	70
1931	60	55	54	66	85	81	84	85	83	82	84	81	75
1932	81	82	83	76	74	68	74	73	75	74	81	85	77
1933	90	80	74	63	68	66	68	66	68	69	68	74	71
1934	78	83	74	68	63	66	77	80	84	88	86	83	78
1935	79	78	84	90	88	88	101	97	99	98	98	96	91
1936	106	118	117	124	123	134	137	136	146	143	139	137	130
1937	146	129	125	126	117	112	119	120	112	105	103	97	118

1/ Calculated on a corresponding month basis, January 1910 to December 1914 equals 100.

2/ Simple average of monthly index numbers.

Table 13.- Index Numbers of the Spot Price Per 100 Kilograms of No. 2 Semi-hard Wheat at Buenos Aires, in Argentine Currency, By Months, 1920-1921 to 1937-1938 1/

(1912-1914 = 100)

Crop year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Average 2/
1920	294	258	262	293	292	-	220	196	210	193	204	208	239
1921	210	199	188	156	136	140	135	148	159	157	157	142	161
1922	149	131	127	138	130	135	143	139	142	141	141	136	138
1923	129	121	125	136	141	138	136	124	127	128	135	143	132
1924	169	165	159	174	166	174	202	202	200	184	191	176	180
1925	170	165	148	148	154	186	197	183	176	178	176	170	171
1926	165	156	153	161	148	136	138	134	138	135	150	146	147
1927	146	136	131	133	127	128	136	129	136	141	147	136	135
1928	131	113	109	115	109	111	119	117	119	113	106	102	114
1929	123	116	113	118	112	126	136	128	125	124	124	119	122
1930	114	107	95	90	75	73	75	71	66	69	71	69	81
1931	67	62	63	78	79	74	76	78	83	82	85	78	75
1932	76	76	75	74	65	65	67	62	64	66	70	68	69
1933	76	68	64	60	58	63	69	67	69	67	68	72	69
1934	75	86	78	71	68	73	77	74	79	86	86	80	78
1935	79	79	91	98	87	108	123	117	121	117	119	115	104
1936	124	127	117	125	114	126	132	131	151	162	162	151	135
1937	152	150	153	178	146	132	146	139	135	128	119	106	141

1/ Calculated on a corresponding month basis, January 1912 to December 1914 equals 100.

2/ Simple average of monthly index numbers.

Table 14.- Index Numbers of the Spot Price Per Quarter of 480 Pounds of Imported Parcels at Liverpool, in English Currency, By Months, 1920-1921 to 1937-1938 1/

(1910-1914 = 100)

Crop year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Average 2/
1920	273	269	267	297	323	271	285	241	231	212	223	213	259
1921	210	202	188	153	143	133	142	161	154	149	157	148	162
1922	152	133	126	139	140	129	136	134	126	132	138	133	135
1923	128	120	120	122	124	113	130	134	122	120	128	136	125
1924	154	155	159	178	175	164	192	199	176	156	175	171	173
1925	165	169	150	141	155	160	170	167	145	154	164	162	158
1926	164	153	150	162	160	142	151	149	140	140	156	158	152
1927	158	158	142	141	138	128	141	139	136	143	147	141	142
1928	138	119	118	121	121	109	123	128	119	112	110	112	119
1929	138	134	129	126	120	122	132	118	106	108	108	105	122
1930	102	100	86	83	76	64	64	67	60	64	68	64	75
1931	61	58	54	69	82	72	75	80	77	74	77	70	70
1932	72	76	78	74	72	62	69	64	61	63	72	71	70
1933	81	69	72	60	61	54	63	61	58	58	60	62	63
1934	72	85	79	71	70	69	74	72	74	72	79	75	74
1935	78	80	85	92	80	80	92	85	82	79	80	80	83
1936	95	105	103	112	108	110	124	118	122	134	132	126	116
1937	138	124	126	127	124	118	110	120	97	95	92	95	114

1/ Calculated on a corresponding month basis, January 1910 to December 1914 equals 100. The corresponding base months of March and April contained averages of only four quotations. See Table 9 for explanation concerning base period.

2/ Simple average of monthly index numbers.

Table 15.- Index Numbers of the Price Per Bushel of No. 2 Hard Winter Wheat at Kansas City, By Months, 1920-1921 to 1937-1938 1/
(1910-1914 = 100)

Crop year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Average 2/
						Currency							
1920	302	269	258	219	189	178	178	170	162	138	152	144	197
1921	133	127	129	116	117	115	117	136	140	141	138	122	128
1922	128	114	110	119	126	123	118	121	122	125	120	109	120
1923	108	111	115	118	117	115	117	117	114	108	109	113	114
1924	135	130	127	145	154	171	188	190	179	157	168	167	159
1925	174	180	167	167	175	181	184	180	169	166	160	160	172
1926	155	144	140	147	147	146	142	142	139	136	146	151	144
1927	154	148	138	135	141	139	138	140	145	158	165	154	146
1928	135	116	113	116	120	117	118	124	122	115	104	110	118
1929	143	136	131	129	128	128	123	119	107	105	102	93	120
1930	90	89	82	78	74	75	72	72	73	76	75	71	77
1931	90	47	45	51	63	55	55	57	53	55	56	48	53
1932	51	53	51	48	46	44	46	46	50	62	72	80	54
1933	111	99	92	78	90	84	87	89	86	81	89	93	91
1934	105	117	114	108	110	110	105	105	102	109	102	92	106
1935	112	114	122	126	122	117	117	116	111	106	98	100	113
1936	125	134	129	129	131	141	143	143	146	146	136	127	136
1937	138	123	116	112	101	101	107	105	96	88	82	80	104
						Gold 3/							
1932	51	53	51	48	46	44	46	46	50	60	61	65	52
1933	79	72	62	99	56	54	55	53	51	48	52	55	58
1934	62	69	67	64	65	65	62	62	60	65	60	54	63
1935	66	67	72	74	72	69	69	68	68	63	58	59	67
1936	74	79	76	76	78	84	84	84	86	86	80	75	80
1937	81	72	69	66	60	60	63	62	57	52	49	48	62

1/ Calculated on a corresponding month basis, January 1910 to December 1914 equals 100.
2/ Simple average of monthly index numbers.
3/ Calculated by dividing the index number of the price of wheat in currency by the corresponding index numbers of the price of gold as given in Table 5.

Table 16.- Index Numbers of the Average Spot Price of No. 3 Manitoba Northern Wheat at Winnipeg, in Gold, by Months, 1920-1921 to 1937-1938 1/
(1910-1914 = 100)

Crop year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Average 2/
1920	241	237	256	224	201	186	186	184	182	165	175	176	201
1921	167	153	133	110	105	108	110	135	140	140	143	129	131
1922	129	110	101	106	118	114	119	121	120	126	121	118	117
1923	106	105	103	99	98	96	100	103	100	99	101	115	102
1924	135	138	145	166	172	187	212	224	188	165	191	178	174
1925	164	164	140	133	153	172	169	165	155	162	158	158	158
1926	159	143	142	151	147	142	142	146	147	147	160	163	149
1927	164	148	139	141	139	144	142	142	146	156	156	142	147
1928	128	110	113	123	125	126	130	138	134	128	117	123	124
1929	162	165	153	149	142	150	142	126	113	114	114	107	136
1930	96	90	79	75	67	56	54	61	56	60	58	58	68
1931	52	47	46	49	59	50	50	55	56	55	54	47	52
1932	46	47	46	46	43	38	40	40	43	46	49	52	45
1933	57	48	44	41	42	40	43	42	41	40	42	46	44
1934	49	50	50	48	50	51	49	49	50	53	50	48	50
1935	46	46	52	54	51	52	54	52	51	49	46	47	50
1936	55	59	63	69	69	79	82	82	87	87	82	78	74
1937	88	74	76	77	74	79	83	82	76	76	68	67	76

1/ Calculated by dividing the index numbers of the price of wheat from in Table 11 by the corresponding index numbers of the price of gold as given in Table 4.

2/ Simple average of monthly index numbers.

Table 17.- Index Numbers of the Average Price Per Bushel of Milling Wheat at Sidney, in Gold, by Months, 1920-1921 to 1937-1938 1/
(1910-1914 = 100)

Crop year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Average 2/
1920	187	165	158	157	157	159	181	186	190	187	190	184	175
1921	177	169	168	176	183	184	112	122	140	134	141	144	147
1922	142	131	129	130	133	143	153	147	146	140	146	143	140
1923	133	116	113	113	111	132	108	111	111	115	118	121	114
1924	139	146	141	155	155	157	180	186	172	156	163	167	163
1925	160	157	155	147	151	155	163	161	156	162	165	169	158
1926	178	174	170	160	142	136	141	138	137	144	145	149	151
1927	147	140	143	128	140	138	145	139	148	147	149	146	142
1928	142	120	115	116	117	115	122	125	124	119	113	115	120
1929	137	133	134	131	126	130	136	123	114	114	112	109	125
1930	98	90	74	63	61	56	48	44	44	46	51	47	60
1931	46	42	38	40	50	44	47	48	50	50	51	48	46
1932	47	47	47	42	40	37	41	41	42	42	45	47	43
1933	49	43	38	32	36	35	35	32	34	33	34	36	36
1934	38	41	36	32	30	32	36	38	39	41	41	40	37
1935	38	38	40	43	42	42	48	47	48	47	47	47	44
1936	52	57	57	59	58	64	65	64	69	68	66	66	62
1937	70	62	60	61	57	54	58	58	54	51	49	46	57

1/ Calculated by dividing the index numbers of the price of wheat from Table 12 by the corresponding index numbers of the price of gold as given in Table 1.

2/ Simple average of monthly index numbers.

Table 18.- Index Numbers of the Spot Price Per 100 Kilograms of No. 2 Semi-hard Wheat at Buenos Aires, in Gold, By Months, 1920-1921 to 1937-1938 1/
(1912-1914 = 100)

Crop year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Average 2/
1920	281	232	230	170	233	-	181	163	170	148	152	151	192
1921	144	137	135	118	104	109	108	127	137	131	134	120	125
1922	126	111	107	116	111	120	126	122	124	122	119	113	118
1923	104	94	97	104	104	103	103	98	101	99	105	109	102
1924	128	131	132	151	147	159	191	190	186	166	178	167	160
1925	161	157	140	143	151	181	192	177	164	167	166	162	164
1926	157	149	146	155	142	132	135	132	137	135	149	146	143
1927	146	137	131	134	128	129	137	130	137	142	148	136	136
1928	130	112	108	114	108	110	118	116	118	112	106	100	113
1929	121	115	112	116	110	122	129	114	111	114	112	104	115
1930	97	92	80	73	61	57	54	53	54	53	52	50	65
1931	48	42	39	42	48	45	46	47	50	50	51	48	46
1932	46	46	45	45	40	39	41	38	39	40	42	41	42
1933	46	43	38	36	34	32	34	31	32	32	32	34	35
1934	35	41	36	32	31	34	35	34	35	39	39	37	36
1935	36	36	42	45	40	50	56	54	56	54	55	54	48
1936	58	59	54	57	52	58	60	60	69	74	74	69	62
1937	74	69	70	82	68	61	68	65	62	59	56	48	65

1/ Calculated by dividing the index numbers of the price of wheat as found in Table 13 by the corresponding index numbers of the price of gold as given in Table 2.

2/ Simple average of monthly index numbers.

Table 19.- Index Numbers of the Spot Price Per Quarter of 480 Pounds of Imported Parcels at Liverpool, in Gold, By Months, 1920-1921 to 1937-1938 1/

(1910-1914 = 100)

Crop year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Average 2/
1920	214	200	192	214	230	197	225	193	187	159	181	165	196
1921	156	154	144	123	117	116	124	145	136	136	143	135	136
1922	140	122	115	127	129	123	130	129	121	127	132	126	127
1923	121	113	112	114	111	101	114	118	108	108	114	121	113
1924	139	144	146	164	165	158	187	194	173	154	175	171	164
1925	165	163	150	141	155	160	170	167	145	154	164	162	158
1926	164	153	150	162	160	142	151	149	140	140	156	158	152
1927	158	151	142	141	138	128	141	139	136	143	147	141	142
1928	138	119	118	121	121	109	123	128	119	112	110	112	119
1929	138	134	129	128	120	122	132	118	106	108	108	105	122
1930	102	100	86	81	76	64	64	67	60	64	68	64	75
1931	61	50	48	55	61	51	54	57	58	57	58	52	55
1932	53	54	56	51	48	43	48	45	43	44	49	49	49
1933	56	46	46	38	40	36	41	38	36	36	38	38	41
1934	44	52	48	43	42	42	44	43	43	43	47	45	45
1935	47	48	51	55	48	48	55	51	49	48	49	49	50
1936	58	65	64	67	64	66	74	71	73	80	80	76	64
1937	82	75	76	76	75	72	66	73	58	57	55	57	69

1/ Calculated by dividing the index numbers of the price of wheat as found in Table 14 by the corresponding index numbers of the price of gold as given in Table 3.

2/ Simple average of monthly index numbers.

Table 20.- Average of the Index Numbers of the Price of Wheat in Five Countries, in Gold, By Months, 1920-1921 to 1937-1938 1/

Crop year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Average 2/
1920	245	221	219	197	202	188*	191	180	178	159	170	164	192
1921	155	147	142	129	125	110	114	133	139	136	140	130	133
1922	133	118	112	120	123	125	129	128	127	128	128	122	124
1923	114	108	106	110	108	103	108	109	107	106	109	116	109
1924	135	138	138	156	159	166	192	194	180	160	175	170	163
1925	165	164	190	146	157	170	176	170	158	162	163	162	162
1926	163	152	150	155	148	140	142	141	140	140	151	153	148
1927	154	145	139	136	137	136	141	138	143	149	153	144	143
1928	135	115	113	118	118	115	122	126	123	117	110	112	119
1929	140	134	132	131	125	131	132	120	110	110	110	104	123
1930	98	92	80	74	68	62	58	59	57	60	61	58	69
1931	51	46	43	47	56	49	50	53	53	53	54	49	50
1932	49	49	49	46	43	40	43	42	43	46	49	51	46
1933	37	30	46	41	42	39	42	39	39	38	40	42	43
1934	46	51	47	44	44	45	45	45	45	48	47	45	46
1935	47	47	51	54	51	52	56	54	54	52	51	51	52
1936	59	64	63	66	64	70	73	72	77	79	76	73	70
1937	79	70	70	72	67	65	68	68	61	59	55	53	66

1/ The five countries included are: United States, Canada, England, Australia and Argentina; represented by the following markets, respectively: Kansas City, Winnipeg, Liverpool, Sidney, and Buenos Aires.

The average is unweighted.

2/ Simple average.

* Average of four countries, quotation for Buenos Aires not available.

The terminal prices representative of the various countries are as follows: Kansas City, No. 2 Hard Winter the United States; Winnipeg, No. 3 Manitoba Northern, Canada; Sidney, Milling, Australia; Liverpool, Imported Parcels, England; Buenos Aires, No. 2 Semi-hard, Argentina.

Table 21.- World Price Level of 40 Basic Commodities in Gold in 10 Countries, Weighted by International Trade, 1/ 1920-1938
(1910-1914 = 100)

Crop year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Average
1920	255	239	228	218	197	179	178	168	162	156	154	144	190
1921	138	136	134	133	131	134	135	140	142	145	149	149	139
1922	149	148	146	147	148	150	153	157	162	162	160	155	153
1923	149	147	151	151	149	149	147	149	145	149	146	142	148
1924	145	150	148	151	153	157	160	160	159	154	155	155	154
1925	157	156	154	152	151	151	150	147	144	142	142	142	149
1926	142	143	143	142	143	143	141	141	140	139	140	140	141
1927	140	141	141	139	139	139	139	138	140	142	143	142	140
1928	141	138	138	136	136	137	138	139	140	138	136	136	138
1929	136	136	136	135	132	131	130	127	123	123	120	117	129
1930	115	114	112	108	106	103	100	99	98	96	93	93	103
1931	91	90	84	80	79	76	75	75	76	75	73	72	79
1932	71	72	73	70	68	67	67	67	68	67	66	68	69
1933	66	67	64	63	63	64	64	62	62	62	61	62	63
1934	62	64	63	61	62	62	63	63	61	61	62	61	62
1935	61	62	63	63	63	63	64	64	65	64	63	64	63
1936	67	69	70	67	68	71	74	75	77	78	78	77	72
1937	77	76	75	72	70	70	70	70	68	67	65	64	70

1/ The weights are as follows: United States, 29.2; United Kingdom, 29.1; France, 13.7; Canada, 7.5; Netherlands, 5.7; Belgium, 5.1; Australia, 4.6; Sweden, 2.6; New Zealand, 1.5; and Finland, 1.0

Source: Farm Economics, Cornell University, No. 108, June 1938, pp. 2621, and later issues.

Table 22.- Coefficients of Gross Correlation

Variables	Coefficient of Gross Correlation
World Supply, July-June, 1921-1937, Associated with:-	r_{xy}
Liverpool price of Imported parcels, July-June	-.835
Kansas City price of No. 2 Hard Winter, July-June	-.572
Kansas City price of No. 2 Hard Winter, July-June 1/	-.562
Minneapolis price of No. 1 Dark Northern Spring, July-June	-.768
Minneapolis price of No. 1 Dark Northern Spring, July-June 1/	-.728
North Dakota, August-September average price received by farmers	-.620
World Production, July-June, 1921-1937, Associated with:-	
Liverpool price of Imported parcels, July-June	-.726
Kansas City price of No. 2 Hard Winter, July-June	-4.89
Northern Hemisphere Production, July,June, 1921-1937, Associated with:-	
Changes in price from April-May to September-October in cents per bushel of imported parcels at Liverpool 2/	-.805
Miscellaneous Association of:- 1921-1937.	
Liverpool Imported Parcels to Minneapolis No. 1 Dark Northern Spring 3/	+.643
Liverpool imported Parcels to Kansas City No. 2 Hard Winter 3/	+.544
Minneapolis No. 1 Dark Northern Spring to Kansas City No. 2 Hard Winter	+.604
Index of the prices of all commodities (U.S.B.L.S.) to the Price of No. 1 Dark Northern Spring at Minneapolis	+.770
Index of the prices of all commodities (U.S.B.L.S.) to the Price of No. 2 Hard Winter at Kansas City	+.830

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Table 22.- Coefficients of Gross Correlation - Continued

1/ Deflated with an index of 40 Basic Commodities.

2/ Purchasing power was not used, actual prices were correlated as the dependent variable.

3/ Liverpool price of import parcels was deflated with the Statist Index of 45 commodities in England; the United States prices were deflated by the B.L.S Index of all commodities converted to a 1910-1914 base.

In all correlations, except as otherwise footnoted, purchasing power was used in place of actual prices. Unless otherwise stated, the Bureau of Labor Statistics Index of All Commodities on a 1910-1914 base was used in calculating purchasing power. The Index of 40 Basic Commodities used was that prepared by Warren, G. F. and Pearson, F. A. in World Prices and the Building Industry, 1937, p. 21.

Table 23.- Wheat: Relation of Supply and Production to Price

	Prices compared with normal when supply or production is:-											
	30 % below normal	25 % below normal	20 % below normal	15 % below normal	10 % below normal	5 % below normal	Normal	5 % above normal	10 % above normal	15 % above normal	20 % above normal	25 % above normal
World total supply, year beginning July, 1925-26 to 1937-38, related to:												
Liverpool spot price of Imported parcels, July-June, 1925-26-1937-38				128	117	108	100	93	87	81	76	
Kansas City spot price of No. 2 Hard Winter, July-June, 1925-26 to 1937-1938				137	123	111	100	91	83	76	70	
World Production, year beginning July, 1925-26 to 1937-38, related to:-												
Liverpool spot price of Imported parcels, July-June, 1925-26-1937-38					110	105	100	96	92	88	85	
Kansas City spot price of No. 2 Hard Winter, July-June, 1925-26 to 1937-1938					123	110	100	91	83	76	70	
Northern Hemisphere Production, year beginning July, 1925-26 to 1937-38 related to:-												
Changes in price of Imported Parcels at Liverpool, in cents per bushel, from spring, April-May to fall, Sept-Oct., 1925-26 to 1937-38					129	113	100	89	79	71		
United States total supply, year beginning July 1925-26 to 1937-38, related to:												
Kansas City spot price of No. 2 Hard Winter, July-June, 1925-26-1937-1938	155	143	132	122	114	107	100	94	89	84	70	76
Aug.-Sept. average price received by North Dakota producers, 1925-26 to 1937-38	175	157	142	129	118	108	100	93	86	80	75	70
Aug.-Sept. average farm price in Georgia, 1925-26 to 1937-38	116	113	110	107	105	102	100	98	96	94	92	91

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Table 23.- Wheat: Relation of Supply and Production to Price - Continued

	Prices compared with normal when supply or production is:-											
	30 % below normal	25 % below normal	20 % below normal	15 % below normal	10 % below normal	5 % below normal	Normal	5 % above normal	10 % above normal	15 % above normal	20 % above normal	25 % above normal
United States total supply, year beginning July, 1925-26 to 1937-38, related to:												
June price of No. 1 Dark Northern Spring, at Minneapolis, 1925-26 to 1937-38	142	133	124	117	111	105	100	95	91	87	84	80
Minneapolis price of Spring Patent Flour, per barrel, July-June, 1925-26 to 1936-37	128	122	117	112	108	104	100	97	94	91	88	86
United States production, 1925-26 to 1937-38, related to:-												
Kansas City spot price of No. 2 Hard Winter, July-June, 1925-26 to 1937-38	119	115	112	108	105	103	100	98	95	93	91	90

Table 24.- Supply-Price Equation 1/

	Original Equations	Equations revised so that y =100 when x = 100
World's total supply, year beginning July 1925-26 to 1937-38 related to-		
Liverpool spot price of Imported Parcels, July-June, 1925-26 to 1937-38	Log y = 5.01917 - 1.50000 log x	Log y = 5.00000 - 1.50000 log x
Kansas City spot price of No. 2 Hard Winter, July-June, 1925-26-1937-38	Log y = 5.96549 - 1.96667 log x	Log y = 5.93334 - 1.96667 log x
World Production, year beginning July, 1925-26 to 1937-38, related to-		
Liverpool spot price of Imported Parcels, July-June, 1925-26-1937-38	Log y = 3.76977 - 0.88235 log x	Log y = 3.76470 - 0.88235 log x
Kansas City spot price of No. 2 Hard Winter, July-June, 1925-26-1937-38	Log y = 5.90753 - 1.94118 log x	Log y = 5.88236 - 1.94118 log x
Northern Hemisphere Production, year beginning July, 1925-26-1937-38, related to-		
Change in price from April-May to Sept-Oct. in cents per bushel of Imported Parcels at Liverpool, 1925-26 to 1937-38	Log y = 6.87218 - 2.41379 log x	Log y = 6.82758 - 2.41379 log x
United States total supply, year beginning July, 1925-26 to 1937-38, related to-		
Kansas City spot price of No. 2 Hard Winter, July-June, 1925-26-1937-38	Log y = 4.45304 - 1.23311 log x	Log y = 4.46632 - 1.23311 log x
Aug.-Sept. average price received by North Dakota Producer, 1925-26-1937-38	Log y = 5.11506 - 1.56757 log x	Log y = 5.13514 - 1.56757 log x
Aug.-Sept. average farm price in Georgia, 1925-26 to 1937-38	Log y = 2.83033 - 0.42761 log x	Log y = 2.85522 - 0.42761 log x
June price of No. 1 Dark Northern Spring, at Minneapolis, 1925-26 to 1937-38	Log y = 3.94758 - 0.98316 log x	Log y = 3.96632 - 0.98316 log x
Minneapolis price of Spring Patent Flour, per barrel, July-June, 1925-26-1937-38	Log y = 3.40493 - -.70000 log x	Log y = 3.40000 - 0.70000 log x

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Table 24.- Supply-Price Equation - Continued

	Original Equations	Equations revised so that y = 100 when x = 100
United States Production, 1925-1926 to 1937-1938, related to-		
Kansas City spot price of No. 2 Hard Winter, July-June, 1925-26 to 1937-38	Log y = 2.98026 - 0.49443 log x	Log y = 2.98886 - 0.49443 log x

1/ For detailed method of calculation, see Warren, G. F. and Pearson, F. A. - Interrelationships of Supply and Price, Bulletin 466, Cornell University Agricultural Experiment Station, March 1928.

Table 25.- Weighted Average Price Per Bushel of Reported Cash Sales at Five United States Markets, By Years, 1920-1921 to 1937-1938

Crop year	No. 2 Hard Winter at Kansas City	Soft White at Portland 1/	No. 2 Red Winter at St. Louis	No. 1 Dark Northern Spring at Minneapolis	No. 2 Hard Amber Durum at Minneapolis
	Cents	Cents	Cents	Cents	Cents
1920	183	-	213	202	200
1921	120	116 2/	127	148	119
1922	113	119	121	126	107
1923	105	103	107	124	106
1924	135	158	159	158	156
1925	163	148	169	165	144
1926	135	136	138	151	155
1927	135	132	149	141	132
1928	112	117	139	126	113
1929	120	116	130	130	119
1930	76	72	83	82	78
1931	47	56	52	71	76
1932	51	59	55	61	58
1933	88	71	94	91	103
1934	98	81	94	116	138
1935	105	81	95	126	113
1936	121	107	111	147	157
1937	111	87	113	128	107

1/ September 1921 to June 1923, Western White. Prices reported in Northwest Daily Produce News, Seattle.
2/ Average for 10 months, September 1921 to June 1922

Sources: Original, Bureau of Agricultural Economics.
Secondary, Compiled as follows:
1920-1921, Yearbook of Agriculture, 1930.
1922-1937, Agricultural Outlook Charts, 1939. Wheat and Rye, October 1938.

Table 26.- United States Production By Classes - 1921 to 1937

Year	Total United States Production Million bushels	Percent	Hard Red Winter Million bushels	Percent	White Million bushels	Percent	Soft Red Winter Million bushels	Percent	Hard Red Spring Million bushels	Percent	Durum Million bushels	Percent
1921	819	100	323	39.4	84	10.3	222	27.1	132	16.1	58	7.1
1922	847	100	299	35.1	71	8.4	221	26.1	170	20.1	86	10.2
1923	759	100	259	34.2	89	11.7	237	31.2	132	17.4	42	5.5
1924	842	100	352	41.8	49	5.8	186	22.1	193	22.9	62	7.4
1925	669	100	204	30.6	75	11.2	163	24.4	166	24.8	60	9.0
1926	832	100	371	44.5	77	9.3	216	26.0	123	14.8	45	5.4
1927	875	100	322	36.7	98	11.2	167	19.1	207	23.7	81	9.3
1928	914	100	394	43.1	91	10.0	127	13.9	203	22.2	99	10.8
1929	823	100	371	45.2	85	10.3	164	19.9	146	17.7	57	6.9
1930	886	100	404	45.5	86	9.7	180	20.3	157	17.7	60	6.8
1931	962	100	514	54.7	71	7.5	262	27.8	73	7.7	22	2.3
1932	757	100	281	37.2	85	11.2	159	21.0	190	25.1	42	5.5
1933	552	100	177	32.1	88	15.9	162	29.3	107	19.4	18	3.3
1934	526	100	208	39.6	70	13.3	188	35.7	53	10.1	7	1.3
1935	626	100	203	32.4	86	13.7	204	32.6	108	17.3	25	4.0
1936	627	100	260	41.6	100	15.9	207	33.0	51	8.1	9	1.4
1937	874	100	375	42.9	111	12.7	257	29.4	102	11.7	29	3.3
Ave.	775	100	313	40.5	83	10.7	195	25.2	136	17.5	47	6.1

Source: Production data from Agricultural Outlook Charts, 1939, Wheat and Rye, October 1938.

Table 27.- Production and Price Ratios for Various Classes of United States Wheat, By Years, 1921-1922 to 1937-1938 1/

Crop year	Ratios: Soft Red Winter to Hard Red Winter		Ratios: Durum to Soft Red Winter		Ratios: Hard Red Spring to Soft Red Winter		Ratios: Durum to Hard Red Winter		Ratios: Durum to Hard Red Spring	
	Production Ratio	Price Ratio	Production Ratio	Price Ratio	Production Ratio	Price Ratio	Production Ratio	Price Ratio	Production Ratio	Price Ratio
1921	66.8	105.8	26.2	93.7	59.4	116.5	18.0	99.2	44.1	80.4
1922	73.9	107.1	39.1	88.4	77.0	104.1	28.9	94.7	50.7	84.9
1923	91.5	101.9	17.6	99.1	55.8	115.9	16.1	101.0	31.6	85.5
1924	52.9	117.8	33.5	98.1	103.6	99.4	17.7	115.6	32.3	98.7
1925	80.0	103.7	36.9	85.2	101.6	97.6	29.5	88.3	36.3	87.3
1926	58.3	102.2	20.8	112.3	56.9	109.4	12.1	114.8	36.5	102.6
1927	51.9	110.4	48.7	88.6	124.1	94.6	25.3	97.8	39.2	93.6
1928	32.2	124.1	77.7	81.3	159.7	90.6	25.1	100.9	48.6	89.7
1929	44.1	108.3	34.7	91.5	88.9	100.0	15.3	99.2	39.0	91.5
1930	44.5	109.2	33.5	94.0	87.2	98.8	14.9	102.6	38.4	95.1
1931	50.9	118.6	8.3	146.2	27.7	136.5	4.2	161.7	29.9	107.0
1932	56.6	107.8	26.2	105.5	119.5	110.9	14.8	113.7	21.9	95.1
1933	91.3	106.8	11.3	109.6	66.2	96.8	10.3	117.0	17.0	113.2
1934	90.4	95.9	3.6	146.8	28.3	123.4	3.3	140.8	12.9	119.0
1935	100.6	98.5	12.3	118.9	53.6	132.6	12.3	107.6	23.1	89.7
1936	79.5	91.7	4.2	141.4	24.5	132.4	3.4	130.0	17.3	106.8
1937	68.5	101.8	12.2	94.7	39.8	113.3	7.7	96.4	28.2	83.6

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Table 27.- Production and Price Ratios for Various Classes of United States Wheat, By Years, 1921-1922 to 1937-1938 1/ (Continued)

Crop year	Ratios: White to Hard Red Winter		Ratios: White to Hard Red Spring		Ratios: Durum to White		Ratios: Hard Red Spring to Hard Red Winter		Ratios: White to Soft Red Winter	
	Production Ratio	Price Ratio	Production Ratio	Price Ratio	Production Ratio	Price Ratio	Production Ratio	Price Ratio	Production Ratio	Price Ratio
1921	26.1	96.7	64.0	78.4	68.9	102.6	40.9	123.3	37.6	91.3
1922	23.8	105.3	41.8	94.4	121.4	89.9	56.9	111.5	32.2	98.3
1923	34.3	98.1	67.2	83.1	47.0	102.9	51.0	118.1	37.5	93.3
1924	13.9	117.0	25.3	100.0	127.6	98.7	54.8	117.0	26.2	99.4
1925	36.7	90.8	45.2	89.7	80.4	97.3	81.3	101.2	45.9	87.6
1926	28.9	100.7	62.8	90.1	58.1	114.0	33.2	111.9	35.8	98.6
1927	30.4	97.8	47.3	93.6	83.0	100.0	64.4	104.4	58.6	88.6
1928	23.2	104.5	45.0	92.9	108.0	96.6	51.5	112.5	71.9	84.2
1929	22.8	96.7	58.2	89.2	67.0	102.6	39.2	108.3	51.8	89.2
1930	21.3	94.7	54.8	87.8	70.1	108.3	38.8	107.9	47.8	86.7
1931	13.7	119.1	97.4	78.9	30.7	135.7	14.1	151.1	27.0	107.7
1932	30.2	98.0	44.6	82.0	49.1	116.0	67.7	119.6	53.3	90.9
1933	49.5	80.7	82.0	78.0	20.8	145.1	60.4	103.4	54.3	75.5
1934	33.7	82.7	131.7	69.8	9.8	170.4	25.6	118.4	37.3	86.2
1935	42.3	77.1	79.2	64.3	29.2	139.5	53.4	120.0	42.0	85.3
1936	38.3	88.4	196.3	72.8	8.8	146.7	19.5	121.5	48.2	96.4
1937	29.6	78.4	108.5	68.0	26.0	123.0	27.3	115.3	43.2	77.0

1/ Production Ratio was calculated by dividing the percent that the first named class of wheat is of total United States production of all wheat by the percent that the last named class of wheat is of total United States production of all wheat.

Price Ratio was calculated by dividing the weighted average yearly terminal price of the first named class of wheat by the weighted average terminal price of the last named class. The terminal markets representative of each class of wheat are, namely: Hard Red Winter, Kansas City; Soft Red Winter, St. Louis; Hard Red Spring, Minneapolis; Durum, Minneapolis; White, Seattle.

Table 28.- Index Numbers of Seasonal Variation of Prices, Marketings, Exports, and Volume of Futures Trading, United States

	Purchasing Power of No. 2 Hard Winter 1920-37	Actual Prices of No. 1 Northern Spring 1921-35 1/	Actual prices of No. 2 Hard Winter 1921-35 2/	Monthly marketings of Wheat by Farmers 1920-30	Exports of wheat from the United States 1926-36	Volume of trading in Futures at all contract markets in U.S.1926-36
July	97.2	100.9	102.2	211.8	99.4	136.7
August	96.7	101.9	102.3	226.3	164.8	124.9
September	97.3	99.3	100.4	198.4	173.3	93.4
October	98.0	100.8	104.8	132.3	154.8	102.8
November	98.8	101.9	102.9	85.3	116.9	101.2
December	99.7	99.7	98.5	68.5	81.4	80.1
January	102.1	103.7	96.7	55.2	64.9	70.2
February	102.2	99.5	96.2	52.8	48.9	65.6
March	101.4	99.3	97.8	42.0	51.8	81.8
April	102.2	97.9	98.4	36.0	73.7	116.8
May	104.2	96.6	99.6	40.8	88.7	106.6
June	100.2	98.5	100.2	57.6	81.4	119.9
No. of years included	17	15	15	11	11	11

1/ and 2/ Taken from "Seasonal Fluctuations of Wheat Prices", by R. M. Green, Circular No.121 - Kansas State Agricultural Experiment Station.

Table 29.- Average Wholesale Price Per Bushel of No. 1 Northern Spring Wheat, at Minneapolis, By Months, Average 1910-1914 and Annual 1920-1921 to 1937-1938 1/

Crop year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Weighted Average 1/
	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	
1910-14 Av.	102.4	102.8	101.2	100.6	99.2	98.6	100.4	100.4	99.6	99.2	102.0	100.6	
1920	288	256	254	216	179	166	179	172	166	153	157	169	207
1921	167	148	151	134	125	131	134	151	151	158	161	149	143
1922	149	133	118	115	123	125	123	126	124	130	128	117	120
1923	132	118	121	120	114	116	119	121	121	121	122	125	117
1924	137	131	130	146	148	166	189	187	171	150	167	164	156
1925	159	164	150	149	155	169	173	167	161	164	162	163	161
1926	172	149	143	149	146	146	143	142	139	138	147	149	146
1927	147	143	134	129	130	132	135	134	139	153	157	148	136
1928	138	139	119	116	116	115	121	128	125	120	111	115	118
1929	143	135	135	131	128	131	127	125	112	111	107	100	133
1930	92	91	87	82	75	77	76	75	76	79	81	74	83
1931	61	65	69	71	80	73	75	75	70	71	68	60	68
1932	57	58	58	54	49	48	50	49	53	63	74	80	60
1933	108	94	90	85	86	83	88	90	88	83	94	109	94
1934	110	117	125	-	110	112	110	-	-	116	109	101	113
1935	105	120	127	128	120	122	-	-	-	109	102	-	119
1936	-	136	137	139	138	152	156	-	151	145	-	145	146
1937	164	130	122	111	-	103	118	-	-	-	-	-	-

1/ Average of daily prices weighted by carlot sales.

Source: Original, Compiled from Minneapolis Daily Market Record.
Secondary, Compiled as follows:
Crop years, 1910-1914, 1925 Yearbook of Agriculture, Table 30.
1920-1928, 1930 Yearbook of Agriculture, Table 21.
1929-1930, 1932 Yearbook of Agriculture, Table 21.

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Table 30.- Average Wholesale Price of Spring Patent Flour, Per Barrel, at Minneapolis, By Months, Average 1910-14 and Annual 1920-21 to 1937-38 1/

Crop year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Average
	Dols.	Dols.	Dols.	Dols.	Dols.	Dols.	Dols.	Dols.	Dols.	Dols.	Dols.	Dols.	Dols.
1910-14 Av.	4.88	4.88	4.87	4.81	4.94	4.98	5.16	5.25	5.18	5.00	4.93	4.87	-
1920	14.12	13.33	13.02	11.45	9.74	9.28	9.94	9.38	9.18	8.30	9.04	9.40	10.51
1921	9.27	8.34	8.62	7.67	7.59	7.26	7.33	8.17	8.27	8.46	8.32	7.71	8.07
1922	7.95	7.22	6.68	6.76	6.88	6.86	6.71	6.72	6.72	7.00	6.80	6.35	6.89
1923	6.21	6.37	6.45	6.43	6.21	6.30	6.44	6.51	6.49	6.56	6.83	7.12	6.49
1924	7.72	7.69	7.52	8.19	8.22	9.30	9.80	10.02	9.34	8.54	9.12	8.86	8.67
1925	8.78	9.04	8.52	8.52	8.81	9.52	9.85	9.46	9.19	9.20	9.00	9.32	9.10
1926	9.27	8.50	7.87	8.08	7.85	8.02	7.95	7.85	7.74	7.75	8.23	8.39	8.12
1927	8.26	7.98	7.52	7.43	7.38	7.37	7.48	7.47	7.88	8.48	8.68	8.36	7.86
1928	7.63	6.94	6.87	6.76	6.68	6.68	7.00	7.40	7.23	7.07	6.60	6.68	6.96
1929	8.38	7.96	7.79	7.38	7.29	7.54	7.89	6.91	6.71	6.67	6.43	6.31	7.22
1930	6.01	5.92	5.54	5.42	5.24	5.34	5.37	5.22	5.07	4.94	5.17	5.08	5.36
1931	4.56	4.50	4.44	4.52	5.01	4.75	4.50	4.42	4.31	4.62	4.71	4.38	4.56
1932	4.24	4.43	4.44	4.19	4.02	4.07	4.11	4.10	4.32	4.92	5.41	5.77	4.50
1933	8.03	7.97	7.54	7.21	7.28	7.06	7.27	7.28	7.15	6.72	7.06	7.44	7.30
1934	7.59	7.93	7.89	7.98	7.47	7.37	7.32	7.31	7.20	7.41	7.47	6.93	7.46
1935	7.46	7.93	8.53	8.72	8.37	8.31	7.57	7.07	6.91	6.64	6.42	6.78	7.56
1936	7.28	7.60	7.58	7.68	7.43	7.69	7.75	7.64	7.63	7.68	7.43	7.26	7.55
1937	7.32	6.68	6.54	6.45	6.01	6.26	-	-	-	-	-	-	-

1/ In 98 pound cotton sacks, 1920-1921 to 1931-1932; Sold in bulk 1932 - Basis of all quotations carloed lots.

Source: Original, Minneapolis Daily Market Record.
Secondary, Bureau of Agricultural Economics, compiled as follows:
Crop years 1920-1927, 1930, Yearbook of Agriculture.
1928-1937, Agricultural Statistics, 1938.

Table 31.- Average Wholesale Price Per Ton of Standard Middlings in 100# Sacks, at Minneapolis, By Months, Average 1910-1914 and Annual 1920-1921 to 1937-1938 1/

Crop year	July Dolls.	Aug. Dolls.	Sept. Dolls.	Oct. Dolls.	Nov. Dolls.	Dec. Dolls.	Jan. Dolls.	Feb. Dolls.	Mar. Dolls.	Apr. Dolls.	May Dolls.	June Dolls.	Average Dolls.
1910-14 Av.	21.53	22.82	22.77	21.25	21.00	21.20	21.75	21.86	21.26	20.67	20.67	20.44	
1920	54.22	52.12	45.79	30.58	28.86	23.94	23.47	20.91	20.87	15.38	15.29	14.83	28.86
1921	14.87	14.64	13.95	13.16	15.32	20.73	20.51	24.76	25.52	23.21	21.20	17.13	18.68
1922	17.30	16.24	18.03	23.06	23.23	23.73	25.81	27.26	28.11	27.79	28.85	25.69	23.76
1923	24.83	25.89	27.85	27.78	25.13	23.80	25.43	23.95	21.65	20.96	18.00	19.92	23.78
1924	24.46	25.68	25.27	26.64	27.99	31.44	33.08	26.89	23.62	24.28	29.07	29.68	27.28
1925	25.53	26.95	26.37	24.19	26.31	25.28	26.10	23.71	22.03	24.20	21.77	21.60	24.50
1926	22.96	23.01	22.67	22.31	24.16	27.38	27.35	28.61	28.46	27.79	29.13	29.10	26.03
1927	32.10	34.75	29.40	26.75	29.00	29.80	30.25	33.60	35.45	34.40	37.60	35.40	32.38
1928	31.80	24.15	27.50	28.50	30.75	31.10	30.40	28.40	25.70	22.40	21.90	22.90	27.13
1929	28.40	29.50	32.75	31.75	28.80	27.90	26.50	24.20	22.40	26.75	24.60	21.75	27.11
1930	20.10	24.30	21.45	18.90	17.50	15.50	14.10	13.00	17.40	18.75	13.30	11.75	17.17
1931	10.90	10.10	10.10	10.10	14.10	12.90	12.05	10.90	12.50	13.00	10.55	8.95	11.35
1932	8.80	9.00	8.20	7.70	7.95	7.25	7.70	8.75	10.30	10.90	12.30	12.30	9.26
1933	19.25	19.10	16.00	14.50	14.65	12.80	14.70	16.20	17.90	17.30	16.85	21.95	16.77
1934	22.00	23.75	22.25	21.75	25.25	31.00	27.25	25.90	24.90	26.75	29.25	24.15	25.35
1935	19.80	18.00	17.25	16.70	15.45	16.40	15.50	15.50	15.80	17.55	17.80	22.20	17.33
1936	27.30	30.90	27.50	28.05	34.25	33.20	34.10	32.70	35.35	37.90	36.50	32.50	32.52
1937	31.75	19.65	19.75	20.55	19.90	19.62	21.69	20.44	20.05	18.00	18.60	19.80	-

1/ Monthly prices prior to 1927 are simple averages of daily quotations; after 1927 prices are simple averages of 1 days quotation each week, bagged, carlot basis. After 1927 the prices were compiled from reports made directly to the Bureau of Agricultural Economics

Source: Original, Minneapolis Daily Market Record, Compiled by the Bureau of Agricultural Economics.
Secondary, Compiled as follows: Crop Year, 1910-14, 1930 Yearbook of Agriculture, Table 28.
1920-1926, 1930 Yearbook of Agriculture, Table 28.
1926-1936, Agricultural Statistics, 1938, Table 27.
1937 Crops and Markets, Vol. 14 and 15.

Table 31.- Average Wholesale Price Per Ton of Standard Middlings in 100# Sacks, at Minneapolis, By Months, Average 1910-1914 and Annual 1920-1921 to 1937-1938 - Continued

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In the preparation of flour the wheat kernel is first cleaned and then moistened to toughen the bran. It is then passed through a set of steel rollers, which breaks the wheat into small pieces, flattening the outside layers of the kernel. After passing through each set of rollers the wheat runs over a number of sieves which remove the flour. In each step in the process more flour is recovered and the by-products are removed. In the manufacture of wheat into flour the miller is interested in securing as much of the gluten or starch as possible and as little of the bran and germ. The germ tends to make the flour dark and turn it rancid. The dough from flour containing a large quantity of germ is sticky.

The bran consists of the outer layers of the kernel and is the roughest of all the by-products. The bran is rich in protein and minerals while the germ contains a large amount of oil. The finer by-products of flour manufacture are called standard middlings when prepared from spring wheat, and are called bran shorts or white middlings when coming from winter wheat.

Around 72 to 75 percent of the entire kernel goes into making flour while the rest consists of by-products. Bran and standard middlings each make up about 11 percent of the original grain.

Table 32.- Average Wholesale Price Per Ton of Standard Bran in 100 Pound Sacks at Minneapolis, By Months, Average 1910-1914 and Annual 1920-1921 to 1937-1938 1/

Crop year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Average 2/
	Dols.	Dols.	Dols.	Dols.	Dols.	Dols.	Dols.	Dols.	Dols.	Dols.	Dols.	Dols.	Dols.
1910-14 Ave 1/	18.30	19.85	19.71	18.84	19.39	20.13	21.13	21.09	20.78	19.97	19.52	17.92	-
1920	45.52	41.86	38.42	30.62	31.30	26.41	25.93	21.44	21.63	16.41	15.97	14.80	27.53
1921	14.86	13.91	12.95	12.15	14.79	20.63	20.98	24.75	23.85	22.29	20.91	15.35	18.05
1922	15.31	14.86	16.88	21.81	22.65	24.09	25.99	27.34	28.22	27.74	26.75	20.83	22.64
1923	19.84	23.62	27.79	28.07	25.63	24.77	24.98	23.66	22.00	20.84	17.66	19.12	23.17
1924	22.27	23.43	23.80	24.66	25.62	30.43	30.14	24.49	23.45	23.46	26.84	26.34	25.34
1925	23.58	24.20	23.09	22.83	25.73	26.34	26.17	23.68	22.45	25.85	23.30	21.31	23.96
1926	22.02	21.69	21.64	21.33	23.14	26.02	26.48	27.64	26.96	27.31	28.43	26.51	24.93
1927	25.13	26.85	25.88	25.96	28.41	30.09	30.66	32.47	35.68	34.28	35.03	29.68	30.01
1928	27.29	24.10	25.49	28.09	30.82	31.69	30.54	28.64	26.88	22.93	22.38	22.56	26.79
1929	26.17	26.44	29.19	20.21	27.90	27.66	26.58	24.45	23.17	27.43	25.06	21.25	26.13
1930	19.33	24.17	21.43	19.98	17.97	16.57	15.61	14.66	17.87	19.02	14.15	11.38	17.67
1931	10.30	10.55	10.02	9.93	14.17	13.04	12.99	11.65	13.35	13.63	10.74	9.45	11.65
1932	8.56	8.58	8.44	7.93	8.33	8.15	8.27	9.35	10.82	11.82	12.17	11.56	9.50
1933	18.18	17.31	14.36	13.41	13.71	12.89	14.80	16.55	19.29	17.77	17.55	21.45	16.44
1934	19.90*	22.56	22.13	21.75	24.25	29.05	27.13	26.25	24.88	25.90	25.13	20.56	24.12
1935	17.60	16.25	15.00	15.50	15.50	16.05	15.63	15.44	15.70	17.56	14.88	17.00	16.01
1936	25.75	26.00	23.60	25.75	30.37	32.20	33.75	31.31	33.45	36.44	32.12	24.90	29.36
1937	25.25	18.45	18.13	19.00	19.60	19.31	21.88	20.50	20.35	18.25	17.80	16.10	-

1/ Original data for the period 1910-14 for Pure Bran. The base period 1910-14 for Standard bran was calculated by subtracting from the quoted monthly price of Pure bran the average difference between average monthly prices of Pure bran and Standard bran at Minneapolis for the crop years 1920-21 to 1927-28. This difference amounted to 76 cents per ton.

2/ Simple average.

* Beginning in 1934 the prices are averages of one day's quotation per week. Prior to this date prices are averages of daily quotations.

Source: Original, Minneapolis Daily Market Record. Secondary, compiled as follows: 1910-14 to 1928-34, Yearbook of Agriculture, 1928, 1935, Table 29. 1935-36, Agricultural Statistics, 1937-1938, Table 26. 1937, Crops and Markets, Volume 14 and 15, 1937 and 1938.

Table 33.- Retail Price Per Pound (baked weight) of White Bread at Minneapolis, By Months, Average 1913-1914 and Annual 1920-1921 to 1937-1938

Crop year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.
1913-14 Av.	5.6	5.6	5.6	5.8	5.8	5.8	5.6	5.6	5.6	5.6	5.6	5.6
1920	11.1	11.19	11.1	11.1	10.3	10.3	10.3	10.3	10.3	10.3	9.6	9.6
1921	9.6	9.6	8.6	8.6	8.4	8.4	8.4	8.4	8.4	8.8	8.9	9.0
1922	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
1923	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	8.9	8.9	8.9	8.9
1924	8.9	8.9	8.9	8.9	8.9	9.0	9.0	10.0	10.1	10.1	10.1	10.1
1925	10.1	10.1	10.1	10.0	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.8
1926	9.8	9.3	9.3	8.9	8.9	8.9	8.9	9.0	9.0	9.0	9.8	9.0
1927	9.0	8.9	8.9	8.9	8.7	8.7	8.9	8.9	8.9	8.9	8.9	8.9
1928	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	9.0	9.0
1929	9.0	9.0	8.9	8.9	8.8	8.9	8.8	8.8	8.8	8.8	8.8	8.8
1930	8.8	8.8	8.8	8.9	8.9	8.8	8.2	8.1	7.8	7.1	7.1	7.0
1931	7.0	7.0	7.0	7.0	6.9	6.9	6.9	6.9	6.9	6.7	6.7	6.7
1932	6.7	6.7	6.7	6.7	6.7	6.7	6.5	6.5	6.4	6.4	6.4	6.4
1933	7.1	7.2*	7.8	8.2	8.1	8.1	8.2	8.2	8.2	8.2	8.2	8.3
1934	8.4	8.4	8.4	8.4	8.4	8.4	8.3	8.3	8.3	8.4	8.4	8.4
1935	8.4	8.4	8.4	8.3	8.4	8.4	8.3	8.3	8.4	8.0	7.9	7.9
1936	7.9	7.9	7.8	7.8	7.8	7.8	7.8	7.8	7.9	8.1	8.2	8.5
1937	9.1	9.1	9.1	9.1	9.1	9.1	9.1	9.1	9.1	9.1	9.1	9.1

* Prior to August, 1933, prices are of the 15th of the month. From August, 1933 to June, 1936, the prices are averages of two and three quotation on either side of the 15th. Since June, 1936 the prices are as of the Tuesday nearest the 15th of each month.

Source: United States Department of Agriculture and Department of Labor, compiled as follows:
1913 to 1924, Yearbook of Agriculture, 1925.
1924 to 1927, Bureau of Labor Statistics, Bulletin No. 495, Retail Prices 1890 to 1928, August, 1929.
1928 to 1937, Supplied through the courtesy of the Bureau of Labor Statistics, United States Department of Labor.

Table 34.- Index Numbers of the Price Per Bushel of No. 1 Northern Spring Wheat, at Minneapolis, By Months, 1920-1921 to 1937-1938 1/
(1910-14 = 100)

Crop year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Average
1920	281	249	251	215	180	168	178	171	167	154	154	168	195
1921	163	144	149	133	126	133	134	150	152	159	158	148	146
1922	146	108	109	114	124	127	122	126	124	131	126	116	123
1923	109	115	120	119	115	118	118	120	122	122	120	124	118
1924	134	127	128	145	149	168	188	186	172	151	164	163	156
1925	155	160	148	148	156	171	172	166	162	165	159	162	160
1926	168	145	141	148	147	148	142	141	140	139	145	148	134
1927	144	139	132	128	131	134	134	134	148	154	154	147	139
1928	135	116	118	115	117	117	120	128	126	121	109	114	110
1929	140	131	133	130	129	133	126	124	112	112	105	99	123
1930	90	88	86	82	76	78	76	75	76	80	79	74	80
1931	60	63	68	71	81	74	75	75	70	72	67	60	70
1932	56	56	57	54	49	49	50	49	53	64	72	80	57
1933	106	91	89	84	87	84	88	90	88	84	92	108	91
1934	107	114	124	-	111	114	110	-	-	117	107	100	111
1935	102	117	126	127	121	124	-	-	-	110	100	-	115
1936	-	132	135	138	139	154	155	-	152	146	-	144	144
1937	160	126	121	110	-	104	118	-	-	-	-	-	123

1/ Calculated on a corresponding month basis, January 1910 to December 1914 equals 100.

2/ Simple average of monthly index numbers. Averages after 1933 calculated from less than12 quotations.

Table 35.- Index Numbers of the Price Per Barrel of Spring Patent Flour, at Minneapolis, By Months, 1920-1921 to 1937-1938 1/
(1910-1914 = 100)

Crop year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Average 2/
1920	274	254	252	229	198	191	204	192	187	172	183	189	210
1921	180	159	166	153	150	149	150	167	170	176	169	155	162
1922	154	138	129	135	140	141	138	138	138	146	138	128	138
1923	120	121	125	129	126	129	132	133	133	136	138	143	131
1924	149	146	145	164	167	191	201	205	192	178	185	178	167
1925	170	172	165	170	179	196	202	194	189	191	182	187	183
1926	179	162	152	162	159	165	163	161	159	161	167	169	163
1927	160	152	145	149	150	151	153	153	162	176	176	168	158
1928	148	132	133	135	136	137	144	152	148	147	134	134	140
1929	162	152	150	148	148	155	150	142	138	139	130	127	145
1930	116	113	107	108	106	110	110	107	104	103	105	102	108
1931	88	86	86	90	102	98	92	90	88	96	95	88	89
1932	82	84	86	84	82	84	84	84	89	102	110	116	100
1933	156	144	146	144	148	145	149	149	147	140	143	150	147
1934	147	151	152	152	152	151	150	150	148	154	151	139	150
1935	145	151	165	174	170	171	155	145	142	138	130	136	152
1936	141	145	146	152	151	158	159	156	157	160	150	146	152
1937	142	127	126	129	122	128	-	-	-	-	-	-	-

1/ Calculated on a corresponding month basis, January 1910 to December 1914 equals 100.

2/ Simple average of monthly index numbers.

Table 36.- Index Numbers of the Price Per Ton of Standard Middlings, at Minneapolis, By Months, 1920-1921 to 1937-1938 1/
(1910-1914 = 100)

Crop year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Average 2/
1920	252	228	201	144	137	113	108	96	98	74	74	72	133
1921	65	64	61	62	73	98	94	113	120	112	103	84	88
1922	80	71	79	108	111	112	119	125	132	134	140	126	112
1923	115	113	122	131	120	112	117	110	102	101	87	97	111
1924	114	112	111	125	130	148	152	119	111	118	141	145	127
1925	119	118	116	114	125	119	120	108	104	117	105	106	114
1926	107	101	100	104	115	129	126	131	134	134	141	142	122
1927	149	152	129	126	138	140	139	154	167	166	182	173	151
1928	148	106	121	134	146	147	140	130	121	108	106	112	126
1929	132	129	144	149	137	132	122	111	105	129	119	106	126
1930	93	106	94	89	83	73	65	60	82	91	64	58	80
1931	51	44	44	48	67	61	55	50	59	63	51	44	53
1932	41	39	36	36	38	34	35	40	49	53	60	60	43
1933	89	84	70	68	70	60	68	74	84	84	82	107	78
1934	102	104	98	102	120	146	125	118	117	129	142	118	122
1935	92	79	76	79	74	77	71	71	74	85	86	109	81
1936	127	135	121	132	163	157	157	150	166	183	177	159	152
1937	147	86	87	96	93	92	100	94	94	87	90	97	97

1/ Calculated on a corresponding month basis, January 1910 to December 1914 equals 100.

2/ Simple average of monthly index numbers.

Table 37.- Index Numbers of the Price Per Ton of Standard Bran in 100 Pound Sacks at Minneapolis, By Months, 1920-1921 to 1937-1938 1/
(1910-14 = 100)

Crop Year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Average 2/
1920	249	211	195	163	161	131	123	102	103	78	82	83	140
1921	79	70	66	64	76	102	99	118	113	106	107	86	90
1922	84	71	86	116	117	120	123	130	134	132	137	116	114
1923	108	119	141	149	132	123	116	112	104	99	90	107	117
1924	122	118	117	131	132	151	143	116	111	111	138	147	128
1925	129	122	117	121	133	131	124	112	105	119	119	119	121
1926	120	109	110	113	119	129	125	131	128	130	146	148	126
1927	137	135	131	138	146	150	145	154	169	162	180	166	151
1928	149	122	129	149	159	157	144	136	127	109	115	126	135
1929	143	133	148	150	144	137	126	116	110	130	128	119	132
1930	106	122	109	106	93	82	74	70	85	90	72	64	89
1931	56	53	51	53	73	65	62	55	63	65	55	53	59
1932	47	43	43	42	43	40	39	44	51	56	62	64	48
1933	99	87	73	71	71	64	70	78	92	84	90	120	83
1934	109	114	112	116	125	144	128	124	118	123	129	115	121
1935	96	82	76	82	80	80	74	73	74	83	76	95	81
1936	141	131	120	137	157	160	160	148	159	173	165	139	149
1937	138	93	92	101	101	96	104	97	96	86	91	90	99

1/ Calculated on a corresponding month basis, January 1910 to December 1914 equals 100.

2/ Simple average of monthly index numbers.

Table 38.- Index Numbers of the Retail Price Per Pound (baked weight) of White Bread, At Minneapolis, By Months, 1920-1921 to 1937-1938 1/
(1913-14 = 100)

Crop year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Average 2/
1920	196	196	196	193	178	178	182	182	184	184	171	171	185
1921	171	171	154	150	145	145	149	149	150	157	159	161	155
1922	161	161	161	156	155	155	159	159	161	161	161	161	159
1923	161	161	161	156	155	155	159	159	159	159	159	159	158
1924	159	159	159	155	153	155	159	177	180	180	180	180	166
1925	180	180	180	174	171	171	175	175	177	177	177	175	176
1926	175	166	166	155	153	153	158	159	161	161	161	161	161
1927	161	159	159	155	150	150	158	158	159	159	159	159	157
1928	159	159	159	155	153	153	158	158	159	159	161	161	158
1929	161	161	159	155	152	153	156	156	157	157	157	157	157
1930	157	157	157	155	153	152	145	143	139	127	127	125	145
1931	125	125	125	122	119	119	122	122	123	120	120	120	122
1932	120	120	120	116	116	116	115	115	114	114	114	114	116
1933	127	139	139	143	140	140	145	145	146	146	146	146	141
1934	150	150	150	146	145	145	147	147	148	150	150	150	148
1935	150	150	150	144	145	145	147	147	150	143	141	141	146
1936	141	141	139	136	134	134	138	138	141	145	146	152	140
1937	162	162	162	158	157	157	161	161	162	162	162	162	161

1/ Index numbers calculated on a corresponding month basis, January 1913 to December 1914 equals 100.

2/ Simple average of monthly index numbers.

Table 39.- Foreign Exchange Rates, Argentine Peso, By Months, 1912 to 1914 1/ and 1920 to 1937 2/

Year	Jan. Cts.	Feb. Cts.	Mar. Cts.	Apr. Cts.	May Cts.	June Cts.	July Cts.	Aug. Cts.	Sept. Cts.	Oct. Cts.	Nov. Cts.	Dec. Cts.
1912	42.46	42.50	42.60	42.66	42.53	42.51	42.51	42.51	42.51	42.51	42.48	42.50
1913	42.51	42.88	42.72	42.54	42.47	42.48	42.26	42.11	42.11	42.11	42.11	42.11
1914	42.16	42.52	42.54	42.36	42.23	42.23	42.25	43.46	44.86	43.04	43.43	43.72
1920	98.23	98.53	98.41	98.31	97.85	96.10	92.26	87.10	84.57	81.37	76.87	78.73
1921	79.38	80.39	78.20	73.96	71.85	69.86	65.80	66.56	69.63	73.08	73.47	74.80
1922	77.19	82.58	82.78	80.75	82.41	81.86	81.85	82.09	81.08	81.41	82.23	85.87
1923	84.74	84.22	84.15	83.15	81.68	80.47	77.74	74.46	74.85	73.66	71.15	72.33
1924	73.65	76.35	76.55	74.80	74.63	73.89	74.12	76.66	80.03	83.55	85.49	88.32
1925	91.88	90.33	89.71	86.88	90.24	91.33	91.75	91.70	91.71	93.36	94.44	94.21
1926	94.13	93.27	90.33	90.79	91.31	91.66	92.05	91.96	92.20	92.75	92.39	93.28
1927	93.85	94.72	95.98	96.17	96.20	96.44	96.55	96.84	97.12	97.16	97.05	97.23
1928	97.11	97.14	97.25	97.19	97.20	96.94	96.14	95.90	95.66	95.59	95.82	95.75
1929	95.76	95.76	95.56	95.56	95.52	95.28	95.38	95.39	95.34	95.00	93.92	93.00
1930	91.36	86.53	85.64	88.64	87.22	84.48	82.05	82.48	81.78	78.05	78.12	75.55
1931	69.78	71.94	78.04	76.46	70.71	70.25	69.88	64.57	59.70	52.00	58.84	58.52
1932	58.27	58.22	58.29	58.22	58.32	58.52	58.56	58.57	58.59	58.58	58.58	58.58
1933	58.58	58.58	58.38	60.89	67.90	71.06	80.72	79.43	86.09	86.12	92.04	33.33*
1934	33.90	33.55	33.96	34.35	34.04	33.66	33.61	33.77	33.29	32.95	33.21	32.95
1935	32.60	32.46	31.80	32.22	32.56	32.87	33.03	33.12	32.86	32.71	32.82	32.85
1936	33.87	33.33	33.14	32.95	33.11	33.42	33.49	33.50	33.61	32.67	32.58	32.72
1937	32.72	32.63	32.57	32.77	32.93	32.90	33.11	33.21	33.02	33.03	33.31	33.31
1938	33.33	33.45	33.26	33.21	33.12	33.15	32.86	32.54	32.03	31.79	31.38	31.14

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Table 39.- Foreign Exchange Rates, Argentine Peso, By Months, 1912 to 1914 1/ and 1920 to 1937 2/ - Continued

1/ Average of weekly quotations for paper peso, see *.

2/ Average of noon buying rates for cable transfers in New York, in cents per unit of foreign currency, quoted for gold peso unless otherwise footnoted.

* Beginning December 13, 1933 paper peso, equivalent to 44 percent of gold peso, is quoted in place of the latter. Average for December 1933 is based on paper peso from December 13-31. Average of gold peso for December 1-10 was 75.89¢. Par rate of exchange, gold peso = 96.48¢; paper peso = 42.45¢.

Sources:

1913-14, United States Department of Agriculture, Yearbook Separate No. 881, Statistics for Grain Crops, 1922, p. 604.
1920-23, Statistical Abstract of United States, 1923, p. 660; 1924-26, same, 1926, p. 288; 1927-28, same 1929, p. 298.
1929-38, Monthly Federal Reserve Bulletins.

Table 40.- Index Numbers of the Wholesale Prices of All Commodities, United States, By Months, 1920-1921 to 1937-1938
(1910-1914 = 100)

Crop year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Average 1/
1920	242	236	227	211	195	176	167	153	150	144	141	136	182
1921	136	137	136	137	138	136	134	136	136	136	140	141	137
1922	145	144	145	145	147	147	149	151	153	152	149	147	148
1923	144	143	146	145	144	143	145	146	144	142	140	139	143
1924	140	142	142	143	145	148	150	152	152	149	148	150	147
1925	152	152	151	151	153	151	151	149	147	147	147	147	150
1926	145	145	146	145	144	143	141	140	138	137	138	137	142
1927	138	139	141	141	141	141	141	140	139	141	142	141	140
1928	142	143	144	141	140	140	140	139	140	139	138	139	140
1929	141	141	140	139	137	136	135	134	132	131	130	127	135
1930	123	123	123	121	119	116	114	112	111	109	107	105	115
1931	105	105	104	103	103	100	98	97	96	96	94	93	100
1932	94	95	95	94	93	91	89	87	88	88	92	95	92
1933	101	102	103	104	104	103	105	107	108	107	108	109	105
1934	109	112	113	112	112	112	115	116	116	117	117	116	114
1935	116	118	118	118	118	118	118	118	116	116	115	116	117
1936	118	119	119	119	120	123	125	126	128	128	128	127	123
1937	128	128	128	125	122	119	118	116	116	115	114	114	120

1/ Calculated by the writer, average of monthly index numbers.

Index numbers are those prepared by the Bureau of Labor Statistics, and converted to a 1910-14 base.

Source: Warren, G. F. and Pearson, F. A., Wholesale Prices for 213 Years, 1720 to 1932, Part I, Wholesale Prices in the United States for 135 Years, 1797 to 1932, Cornell University Agricultural Experimentation, Memoir 142, November, 1932; and late issues of Agricultural Situation, Bureau of Agricultural Economics, United States Department of Agriculture.

Table 41.- Index Numbers of the Wholesale Prices of 40 Basic Commodities, United States, By Months, 1920-1921 to 1937-1938
(1910-1914 = 100)

Crop year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Average 1/
1920	260	250	243	221	197	176	167	147	142	133	130	124	182
1921	124	121	123	125	126	125	126	131	139	135	144	146	130
1922	147	146	153	155	157	155	157	160	166	166	158	152	156
1923	146	145	149	150	148	147	149	152	149	146	144	140	147
1924	146	148	147	151	153	159	163	166	166	158	159	160	156
1925	164	161	160	158	158	158	158	156	152	148	149	149	156
1926	150	148	149	147	146	147	145	144	141	141	141	142	145
1927	142	144	145	144	144	143	144	143	144	147	149	146	145
1928	146	142	144	141	140	141	142	142	143	141	137	139	141
1929	143	143	144	141	136	135	133	129	126	128	128	118	133
1930	114	116	115	111	106	103	101	98	97	94	89	88	103
1931	86	86	84	83	86	82	80	78	77	76	73	71	80
1932	72	75	76	73	71	68	66	65	68	71	78	83	72
1933	93	91	93	92	93	92	95	98	98	97	97	99	95
1934	101	106	106	104	105	108	111	113	110	111	112	109	108
1935	109	111	113	114	113	111	114	114	113	112	109	110	112
1936	117	122	124	123	125	130	136	136	140	141	136	134	131
1937	135	132	130	122	116	113	114	114	112	110	107	107	118

1/ Calculated by the writer, simple average of monthly index numbers.

Source: Warren, G. F. and Pearson, F. A., World Prices and the Building Industry, 1937, p. 21.

Table 42.- England: Index Numbers of Wholesale Prices of 45 Commodities, By Months, 1920 to 1938.
(1910-14 = 100)

Crop year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Average 1/
1920	307	305	300	289	270	250	238	220	214	205	195	188	250
1921	191	186	180	167	165	161	160	159	161	162	163	163	169
1922	161	156	164	157	157	156	157	159	160	161	159	154	158
1923	150	151	154	154	160	160	165	167	165	165	164	164	161
1924	167	166	171	176	175	178	174	172	169	166	164	158	170
1925	162	162	160	157	160	157	156	154	152	151	151	151	157
1926	152	153	154	158	158	149	148	150	149	149	149	148	152
1927	147	148	146	145	146	146	146	146	149	151	152	148	148
1928	145	142	141	141	142	142	141	145	145	140	136	136	142
1929	139	137	136	134	130	131	128	126	124	122	119	115	129
1930	114	111	109	109	107	105	103	103	103	102	99	96	106
1931	97	95	97	99	100	103	102	104	101	99	97	93	99
1932	95	97	97	94	94	94	94	93	93	95	98	98	95
1933	98	98	97	97	96	96	99	99	99	98	98	97	98
1934	99	100	99	98	98	100	101	100	100	101	103	101	100
1935	102	101	102	103	104	104	104	104	104	103	103	102	103
1936	105	107	109	110	114	119	120	123	129	126	128	126	118
1937	128	126	124	121	116	117	116	116	114	113	110	110	117

1/ Average calculated by the writer.

Statist Index converted to a 1910-14 base by dividing entire series by 83 (original base: 1867-1877)

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Table 43.- Wheat, Including Flour, in Terms of Grain: International Trade for Important Exporting and Importing Countries, 1920-1937

Year	United States 1/		Canada		Australia		Argentina		British India		United Kingdom	
	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports
	1,000 bus.		1,000 bus.		1,000 bus.		1,000 bus.		1,000 bus.		1,000 bus.	
1920	311,601	39,572	144,345	226	62,373	5	193,099	1	4,941	9	690	234,475
1921	359,021	27,826	179,606	582	116,001	2	65,828	2	13,541	8,241	4,967	184,850
1922	235,387	25,904	252,020	287	84,503	14	145,447	1	6,452	9,060	5,738	213,656
1923	175,190	20,761	293,207	448	62,125	7	140,258	3	31,129	595	10,536	216,283
1924	241,454	15,839	226,277	421	81,198	2	169,924	10	32,825	705	16,560	245,172
1925	138,784	13,955	268,779	660	119,485	3	116,940	2	25,211	483	17,860	200,346
1926	193,971	14,188	297,173	373	74,435	4	81,961	26	11,527	1,763	10,540	205,755
1927	228,576	11,779	296,745	445	104,692	3	163,846	3	15,808	3,405	10,882	233,176
1928	151,994	18,875	413,746	452	80,279	2	203,146	4	8,868	5,974	11,338	214,547
1929	154,348	14,585	254,028	2,175	99,957	3	249,930	2	4,961	26,908	11,178	231,596
1930	149,164	19,977	241,578	427	75,845	3	86,607	3	11,835	7,361	10,403	223,089
1931	125,686	15,692	220,463	266	157,127	2	138,057	1	4,803	9,334	10,636	249,091
1932	82,318	10,027	251,313	165	151,785	2	129,399	2/	2,771	415	12,431	216,977
1933	26,611	10,322	217,342	217	143,631	3	149,381	2/	2,096	2,476	8,103	233,869
1934	36,538	7,741	190,655	806	94,110	4	181,727	0	2,298	354	7,720	214,016
1935	4,639	27,581	187,647	521	101,433	3	146,313	0	2,304	742	6,915	208,375
1936	6,476	39,862	264,867	383	97,710	2	63,209	0	9,287	580	6,162	208,148
1937	45,518	8,789	114,400	1,399	100,515	2	147,647	0	19,930	73	4,013	199,505

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Table 43.- Wheat, Including Flour, in Terms of Grain: International Trade for Important Exporting and Importing Countries, 1920-1937 (Continued)

Year	Italy		Belgium		Netherlands		France		Hungary		Germany	
	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports
	1,000 bus.		1,000 bus.		1,000 bus.		1,000 bus.		1,000 bus.		1,000 bus.	
1920	1,579	79,875	330	34,053	1,095	20,194	1,172	88,517	76	780	918	24,572
1921	325	103,016	4,082	39,600	3,996	23,605	1,692	41,153	6,977	5	812	85,355
1922	1,870	98,538	2,451	3,806	3,484	24,618	2,829	24,941	8,345	195	1,018	52,318
1923	4,889	102,569	2,354	41,772	3,368	28,006	2,754	52,492	12,120	30	223	24,946
1924	6,895	78,462	4,470	45,870	3,988	32,219	3,822	54,918	17,573	545	1,832	55,818
1925	4,565	82,981	5,309	43,481	3,369	29,388	447	44,899	17,708	522	12,797	81,579
1926	1,398	78,976	2,341	39,882	1,875	27,978	2,167	17,610	22,278	1	14,217	85,972
1927	995	84,981	1,812	45,809	638	31,077	292	80,054	19,305	2	4,824	98,989
1928	1,370	108,038	3,096	44,806	601	29,803	126	38,388	20,389	1	12,844	92,810
1929	3,399	65,036	2,241	44,702	800	30,991	131	52,616	31,140	1	14,806	80,195
1930	2,646	71,439	1,171	44,910	723	34,095	30,948	39,358	24,405	3	2,313	45,112
1931	3,938	55,213	6,838	54,437	1,357	34,236	18,021	87,771	19,570	3	10,717	29,850
1932	7,100	39,402	4,256	46,929	976	29,458	7,540	78,816	8,315	2/	18,242	37,947
1933	8,987	17,973	3,331	44,099	164	29,324	12,725	32,399	19,036	2	28,799	28,471
1934	9,293	17,659	2,823	48,212	2,180	2,120	22,843	30,046	19,228	0	15,943	23,897
1935	10,456	20,322	2,293	38,928	1,381	21,562	37,908	28,793	14,820	0	1,116	5,976
1936	7,763	19,780	2,078	44,003	279	20,404	18,342	22,815	23,706	0	3,227	2,752
1937	8,486	61,189	5,579	44,976	1,211	24,209	6,781	18,845	16,388	0	218	47,239

1/ Imports are general imports and include all wheat and wheat flour.
2/ Less than 500.
3/ Preliminary.

Source: Compiled from Original Source by the Bureau of Agricultural Economics. Secondary, Wheat Situation, January 24, page 13.

Table 44.- Wheat: Import duties and other restrictions in principal wheat-importing countries. August 1938

Country	Import duties: In original units	Import duties: In U. S. currency 1/	Milling quota (domestic)	Licenses and monopolies	Other measures 2/
		Cents per bu.	Percent		
Belgium	Free	Free	—	Import license 3/	Special license tax, 10 francs per 100 kilos (9¢ per bu.) re-established July 21, 1938.
	Per Gross Ton				
Brazil 4/	66.31 milreis	11	5% of total milled	—	Law authorizes granting of bonuses to growers; creation of Federal Wheat Institute proposed.
	Per 100 kilos				
China 5/	0.55 Gold Unit	10	—	—	Import duty refunded when wheat is milled and exported as flour; exportation of wheat prohibited.
Japanese-controlled territory	Free	Free	—	—	—
Cuba 6/	$0.32	9	—	—	—
Czechoslovakia 7/	75.00 crowns	70	—	Monopoly	Import permit fee, 1% ad valorem; fixed prices through Grain Monopoly
Denmark 8/	Import tax (variable)	Import tax (variable)	—	Import & export permit	Importation is allowed only with permission of the Government 8/.
Egypt 9/	740 to 1205 milliemes	101 to 164	—	—	Quay tax, 10% of duty; surtax, 3% ad valorem. Export subsidy on trial.
Eire (Irish Free State)	Duty abolished	Free	25	Import license	Importers must be licensed and registered; registered wheat millers pay fixed minimum price to growers.
Estonia	11.00 crowns	81	—	Import & export monopoly	Government purchases for export; fixed price.
Finland10/	100 Finnish marks	99	—	—	Government supervision; millers and others handling foreign wheat obliged to keep records and report to Grain Fund when required

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Table 44.- Wheat: Import duties and other restrictions in principal wheat-importing countries, August 1938 - (Continued)

Country	Import duties: In original units	Import duties: In U. S. currency 1/	Milling quota (domestic)	Licenses and monopolies	Other measures 2/
		Cents per bu.	Percent		
France 11/	96.40 francs	72	12/ 100	Import & export monopoly	National Wheat Board fixes wheat prices.
Germany 13/					
General rate	35 reichsmarks	382		Monopoly control board	Fixed prices and price margins; compulsory delivery all wheat fit for human consumption; distilling and feedings prohibited.
Special rate	1 reichsmark	11			
Greece 14/	10.50 metallic drachmas	98	—	—	Purchase of domestic wheat by Government at prices above world quotation.
Italy 15/	45.00 lire	64	99	Monopoly	Government fixes price of wheat; controls production; regulates sales; controls foreign trade.
	Per 100 kilos				
Japan	2.50 yen	32	—	—	Drawback: Import duty refunded when wheat is milled and exported as flour.
Latvia	Duty abolished	Free	—	State Grain Monopoly	Compulsory regulations govern processing of grain by millers; fixed prices.
Netherlands	Free	Free	35	Monopoly	Monopoly import tax, 2.50 florins per 100 kilos (37¢ per bu.); fixed prices; trade agreement with United States.
Norway	Free	Free	—	State Grain Monopoly	Bounty to producers for grain used on farm; guaranteed minimum price for grain marketed.

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Table 44.- Wheat: Import duties and other restrictions in principal wheat-importing countries, August 1938 - (continued)

Country	Import duties: In original units	Import duties: In U. S. currency 1/	Milling quota (domestic)	Licenses and Monopolies	Other measures 2/
Sweden	3.70 crowns	25	90	Import permit	Imports of wheat intended for production of flour subject to milling, tax, 1.50 kronor per 100 kilos (10¢ per bu.); tax also applicable to domestic wheat; proceeds used to defray expenses incident to grain control system. Exports prohibited except under license.
Switzerland:					
Non-denatured	3.00 francs	19	—	Import quotas	Growers deliver wheat to government agency at fixed prices. This agency sells to millers. Imports regulated by quota. Trade agreement with United States.
Denatured	0.60 franc	4			
	Per 480 lbs.				
United Kingdom	2s.	6	—	—	Empire wheat qualifying for Imperial preference exempt from duty under Ottawa Agreements. Domestic production subsidized to extent of 57,000,000 bushels.

Compiled in Bureau of Agricultural Economics, U. S. Department of Agriculture.

1/ Conversions into United States currency made on the basis of average exchange for August 1938.
2/ Exchange regulations are in use in most of the countries listed.
3/ Import licenses granted on unlimited quantities.
4/ Includes surtax amounting to 10% of the duty. There is an additional surtax of 0.600 milreis per 44 kilos (97 lbs.) of flour theoretically to be extracted from imported wheat at a fixed extraction ratio of 70%.
5/ Includes surtax amounting to 10% of the duty.
6/ Minimum rate, 40¢ per 100 kilos (11¢ per bu.); preferential rate to United States - 20% less than minimum rate.
7/ Includes supplementary duty which varies with the market price of wheat and must not exceed 25 crowns per 100 kilos (23.5¢ per bu.); the basic duty is 50 crowns per 100 kilos (47¢ per bu.)

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Table 44.- Wheat: Import duties and other restrictions in principal wheat-importing countries, August 1938 - continued

8/ On January 1, 1938, a new Danish Grain Law authorized the renewal of import taxes on grains, which had been repealed on January 30, 1937. The new taxes vary with the price of grain. When the current c.i.f. quotations on which taxes are to be collected are above those fixed by the Grain Law, no tax can be collected. By terms of a decree of the Danish Ministry of Agriculture, effective August 26, 1938, a permit from the Government Grain office is required for imports and exports of wheat or rye.
9/ Sliding scale, based on London quotations of Australian wheat, c.i.f. Egyptian ports.
10/ Mills grinding domestic wheat may import an equal amount of foreign wheat at a duty of 65 Finnish marks per 100 kilos (38¢ per bu.).
11/ Semolina millers may be authorized, temporarily and under specified conditions, to import foreign hard wheat in compensation for prior exports of by-products from the milling of hard wheat.
12/ Foreign wheat may be imported only when French wheat is not available in the necessary quantities or qualities. In such a case, the National Wheat Board fixes the amount of wheat to be imported, as well as the sale price of that wheat on the domestic market.
13/ Special reduced rate, 1.00 reichmark per 100 kilos (11¢ per bu.), when imported through an office fixed by the Minister for Food and Agriculture.
14/ Includes surtaxes amounting to three-fourths of the duty.
15/ Import license required; special license tax, 3% ad valorem.

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Table 45.- Wheat: Acreage in Important Producing Countries and Areas, Average 1925-1926 to 1929-1930 and 1930-1931 to 1934-1935, Annual, 1935-1936 to 1937-1938

Country or Area	Average 1925-1926 to 1929-1930	Average 1930-1931 to 1934-1935	1935-1936	1936-1937	1937-1938 1/
	1,000 acres	1,000 acres	1,000 acres	1,000 acres	1,000 acres
Canada	23,104	25,682	24,116	25,605	25,570
United States	58,249	54,194	51,229	48,863	64,460
France	13,249	13,281	13,251	12,865	12,772
Spain	10,703	11,236	11,254	10,768	-
Italy	12,034	12,169	12,432	12,693	12,819
Germany	4,867	5,310	5,205 2/	5,151 2/	4,879 2/
Poland	3,304	4,265	4,334	4,305	4,183
Yugoslavia	4,580	5,099	5,313	5,462	5,269
Rumania	7,746	7,703	8,496	8,480	8,777
Turkey	6,703	7,567	8,474	8,862	8,323
India	31,544	33,340	34,490	33,605	33,222
Argentina	19,019	17,709	11,688	15,862	15,254
Australia	12,797	15,223	11,925	12,342	13,807
North America	82,636	81,137	76,488	75,731 3/	91,303
Europe 4/	70,400	76,100	79,000	78,300	77,200
Danube Basin	18,808	19,823	20,673	20,926	21,063
Southern Hemisphere	37,900	38,500	33,500	34,400	35,100
Northern Hemisphere 4/	205,300	215,600	218,300	215,400	229,800
World 4/	243,200	254,100	248,700	249,700	264,900
Soviet Russia	70,959	85,798	91,566 5/	96,116 5/	101,678 5/

1/ Preliminary. 2/ Excludes the Saar, since production for this area was not included prior to 1935. 3/ Excluding Guatemala. 4/ Excluding U.S.S.R. and China. 5/ Official estimates, but probably not comparable with previous years.

Source: Original, Bureau of Agricultural Economics. Secondary, Agricultural Statistics, 1938, Table 6. Yearbook of Agriculture, 1936.

Table 46.- Wheat: Yield Per Acre in Important Countries, Average 1925-1926 to 1929-1930, and 1930-1931 to 1934-1935, Annual 1935-1936 to 1937-1938

Country	Average 1925-1926 to 1929-1930	Average 1930-1931 to 1934-1935	1935-1936	1936-1937	1937-1938 1/
Canada	18.6	13.6	11.7	8.6	7.1
United States	14.1	13.5	12.2	12.8	13.6
France	22.0	23.0	21.5	19.8	19.9
Spain	13.7	14.1	14.0	11.3	-
Italy	19.0	20.8	22.8	17.7	23.1
Germany	29.4	32.1	32.9	31.6	33.6
Poland	18.3	17.4	17.0	16.2	16.2
Yugoslavia	17.7	15.6	13.8	19.7	16.4
Rumania	13.6	13.4	11.4	15.2	15.7
Turkey	10.1	12.3	10.9	15.7	16.9
India	10.2	10.7	10.5	10.5	11.0
Argentina	12.8	13.8	12.1	15.7	12.1
Australia	10.6	12.2	12.1	12.2	13.1

1/ Preliminary.

Source: Original, Bureau of Agricultural Economics.
Secondary, Agricultural Statistics, 1938, Table 6.

Table 47.- Wheat Production in Important Countries and Areas, Average 1925-1926 to 1929-1930 and 1930-1931 to 1934-1935, Annual 1935-1936 to 1937-1938

Country or Area	Average 1925-1926 to 1929-1930	Average 1930-1931 to 1934-1935	1935-1936	1936-1937	1937-1938
	1,000 Bus.	1,000 Bus.	1,000 Bus.	1000 Bus.	1,000 Bus.
Canada	430,704	348,560	281,935	219,218	182,410
United States	822,712	732,629	626,344	626,766	873,993
France	291,354	305,318	284,950	254,618	257,838
Spain	146,180	158,081	157,985	121,492	132,000
Italy	229,204	252,604	283,883	224,970	296,282
Germany	119,764	170,212	171,481 1/	162,660	164,120
Poland	60,508	74,267	73,884	78,357	70,774
Yugoslavia	80,987	79,494	73,101	107,422	86,238
Rumania	105,531	103,447	96,439	128,717	138,158
Turkey	67,664	93,128	92,640	141,582	140,311
India	320,462	355,593	363,179	351,680	364,075
Argentina	243,028	243,932	141,021	249,193	184,801
Australia	136,006	185,773	142,623	151,390	188,018
North America	1,264,371	1,093,592	918,991 2/	859,590 2/	1,067,619 2/
Europe 3/	1,350,000	1,516,000	1,576,499	1,481,339	1,562,425
Danube Basin	306,536	312,311	301,689	384,278	361,464
Southern Hemisphere	447,000	499,000	372,000	471,000	430,000
Northern Hemisphere 4/	3,176,000	3,298,000	3,225,000	3,067,000	3,399,000
World 4/	3,623,000	3,797,000	3,601,000	3,540,000	3,843,000
Soviet Russia	790,863	924,537	1,132,790 5/	-	-

1/ Excludes the Saar, since production for this territory was not included prior to 1935. 2/ Excluding Guatemala. 3/ Excludes Soviet Russia and China and Danubian Basin countries. 4/ Excludes Soviet Russia and China. 5/ Official Estimates, probably not comparable with previous years.

Source: Original Bureau of Agricultural Economics. Secondary, Compiled as follows: Agricultural Statistics, 1938, Table 6. Data for 1936-37 and 1937-38, from "Wheat Situation", Dec. 23, 1938, page. 15