THE PROBLEM OF THE AGRICULTURAL SURPLUS
IN THE UNITED STATES.

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Two types of studies are necessary in most fields of investigation, the general survey which shows the relation of parts to the whole, and the detailed analysis of specific parts. This thesis is only presented as a generalized discussion and not as a detailed study of any of the numerous questions involved in the welfare of the agricultural classes.

The subject was selected at the suggestion of Dr. J. D. Black. Shortly afterwards, it was announced that the Department of Agriculture at Washington, D. C., was to make a similar study which would be completed about January 1st, 1927. The nineteen page typewritten outline which the Department of Agriculture at Washington prepared of their project, was almost identical to the outline which had been prepared for this thesis.

In view of the fact that the Department of Agriculture study was to be completed first and that they would have better access to material, it was decided to discard the original outline and change the thesis in such a manner as to incorporate their study.

A new outline was prepared with emphasis mainly on the economic theory involved in the surplus problem. The Department of Agriculture had omitted from their classification of surpluses that of a quantity so great that it reduces the total gross or total net returns to the producers. Work was commenced on this concept of a surplus and the analysis made rather complete.

In January, it was announced that other work had taken precedence in the Department and that the report would not be completed until some time in March. The last report was that the
study had been postponed indefinitely and some doubt arises as to whether the study will ever be completed.

It was necessary because of these unforeseen difficulties to change the outline of the thesis a third time. It is, in consequence, not as complete and well-rounded as it would have been written according to the original outline. There will appear to be a great deal of theory and few facts, but this was unavoidable in view of the circumstances.

George M. Petersen.
INTRODUCTION.

The so-called "Agricultural Surplus" has been one of the outstanding economic problems during the last few years, certainly as far as publicity and discussions are concerned. Most newspapers, farm journals and many magazines and periodicals have had some discussion of this topic. A few books have been written about it, e.g., "The Agricultural Situation" by Warren and Pearson in 1924, and "Agricultural Problems in the United States", by the National Industrial Conference Board in 1926. Farmers, businessmen, politicians and special committees have held conferences to discuss conditions and methods of relief. Numerous bills aiming at a solution of the problem have been introduced into congress. The bill introduced by Senator McNary of Oregon on December 14, 1926, came the nearest to becoming a law. It was passed by both houses but vetoed by President Coolidge on February 25, 1927.

Although a great deal has been written and said about this problem, confusion exists as to the nature and causes of the present agricultural depression.

The purpose of this thesis is to analyze the various meanings of the term "Agricultural Surplus"; to show the economic theory involved in an analysis of the most important of these concepts; to review the important proposed remedies; and a few
of the somewhat similar control measures tried by other countries.

At the beginning of the present agricultural depression the problem was seldom referred to as one of the surpluses but rather as a condition caused by the period of deflation following the War. Comment centered, at this time, upon the policy of the Federal Reserve System, as may be illustrated by the paper read by George W. Dowrie before the fifteenth annual meeting of the American Farm Economics Association, December 1924, "Did Deflation Ruin the Farmer and Would Inflation Save Him." This type of discussion has gradually faded away but it has been replaced by discussions of the Agricultural Surplus. The term "surplus" is not new but it seems to have acquired a new meaning, or rather a group of meanings, none of which is distinct or clear and all of which are related in some way. Some people look for definite concrete cause as well as definite concrete remedies for the problems that arise. In many cases especially in questions where human beings are involved there are numerous causes and causation is often cumulative so that it is impossible to single out any one cause or effect. Back in the seventies, the farmers laid most of their troubles to the railroads and proceeded to have them regulated by the government. Since 1920 both the banks and the railroads have been credited with causing the trouble. Suddenly, almost magically, the responsibility for the agricultural depression has been attributed to the "Agricultural Surplus". The term is often used without being defined, and when it is defined, the meaning is often obscure. There are three main variables, time, area and point of view involved in all definitions of the term. The question of whether or not a surplus exists depends on
all three of the conditions. A surplus may exist according to one or more definitions and from the standpoint of one or more groups of people, while at the same time none exists according to other definitions or from other points of view.

Some of the meanings of the term will be analyzed briefly to show their resemblance and differences as well as their significance from a social point of view.

The Surplus Control Act*, more commonly known as "The McNary Haugen Bill", does not directly define a surplus but in Section 6 P C, it states that, "whenever the board finds, first, that there is or may be during the ensuing year either (1) a surplus above the domestic requirements for wheat, corn, rice, tobacco or swine, or (2) a surplus above the requirements for the orderly marketing of cotton or of wheat, corn, rice, tobacco or swine......" The first of these two meanings apparently refers to the quantity available for export and yet not entirely so, since cotton, the main export product of the group is left out of this type of a surplus. Nevertheless this would be a definite concept of a surplus if domestic requirements were something fixed, but since the domestic requirements as well as the exportable residue depend on price and vary with price, this concept becomes indefinite unless it is made to refer to some specific price or some predetermined per capita requirements. Mention of price was undoubtedly left out of the bill for political reasons, to make it appear as if it were not a price fixing measure. The original "McNary Haugen Bill" referred to prices and was objected to on this ground. The second of the meanings is not as clear-cut since it is impossible to state just what constitutes orderly

* Senate Bill 4308 - 69th Congress, Second Session.
marketing. According to such a definition a relative scarcity of freight cars, terminal facilities, or even poor management of any of the steps in marketing results in a surplus of agricultural products. Orderly marketing involves the idea of the elimination of maladjustments between the steps in the marketing process as well as some form of control which regulates the flow of the product from the producer to the consumer, so as to eliminate price changes.

This usually refers to price variations during the year, but may also include the question of price fluctuations from year to year. This type of marketing is speculative especially for crops which mature at different seasons in different parts of the world, and more so in respect to variations in supply from year to year. The marketing agencies which are now accused of being disorderly are far more efficient than the methods which preceded them. Adam Smith, in "The Wealth of Nations" published in 1776 Book IV, Chapter V, points out very clearly the advantages of free trade in corn (grains) as compared to the system of prohibiting or strictly limiting the action of middlemen. Laws were then in effect preventing speculation or forestalling and engrossing as it was then called. The laws attempted to aid in periods of scarcity, but according to Adam Smith, "a famine has never arisen from any other cause but the violence of the government attemption by improper means to remedy the inconveniencies of a death."*

Farmers have always accused the middlemen of being at the bottom of their troubles. Instead of recognizing the services performed by the middlemen the farmers have tried to pass laws

curtailing their actions, especially the organized exchanges which are at present a main agency in eliminating price fluctuations. During the 35 years from 1884 to 1921 a total of 126 bills were introduced into Congress* to regulate or prohibit future trading. No doubt circumstances arise so that occasionally these middlemen make huge profits, but they also incur losses. Studies that have been made show that over a period of years the average seasonal change in price between harvest and the following spring is very slight. The average price by months for wheat, rye, corn, oats and barley shows that the differences between the fall and spring is approximately the cost of storage.** The average difference between the October and March price of potatoes from 1909 to 1919 was 17 cents and between the September and May prices of wheat 6.3 cents. Neither of these margins will more than cover the costs of storage.*** This does not mean that there are regular variations in the different years but it shows that over a period of time, the present marketing tends to be fairly orderly. The most serious variations are caused by the lack of reliable statistics and unforeseen changes. If some system for carrying on the marketing functions can be developed that has command of more complete information and is better able to forecast or control the future than the present system, or that is more efficient, i.e., then the elimination of competitive wastes or thru the gains from large scale operation, so that it can turn over a larger part of the consumers' dollar to the producer, then such a system is highly desirable, but it hardly

* Report of Grain Futures Administration September 9, 1924.
** The federal trade commission report on grain trade September 10, 1924, Vol.VI, Table 13, page 66.
seems proper to refer to such a problem as "a surplus".

The following quotation contains a very brief definition of a surplus: "The real trouble with the surplus-export plans is that nobody knows just what a surplus is. It is nothing more or less than the excess over and above the quantity which would bring the desired price. Therefore a surplus removing plan would be a plan by which the remaining product should be as high as those concerned want. No matter how much effort is made to cover up the price-fixing phases of the plan it remains a price fixing plan."*

We can not help but agree with the first sentence, that nobody knows just what "a surplus" is, but it is doubtful whether anyone knows any more about it after reading the second sentence. It is hard to tell whether Mr. Hibbard meant this as a serious definition or whether he intended it as sarcasm to show just how meaningless the term can be made. On the basis of this definition there is a surplus of every commodity or service, from the standpoint of the particular producers, except where the product is under complete monopoly control. Practically all doctors, lawyers, school teachers, laborers, merchants, manufacturers, and farmers and all others except perhaps some religious or charity workers, desire a higher price for their products, but from a social point of view the fact that they can not obtain it does not prove that there is a surplus of people engaged in these vocations. This definition is therefore worthless except in so far as it shows that the question of whether or not there is a surplus depends largely on a particular point of view.

Mr. Hibbard gives another definition of "a surplus" or rather three different definitions, in the Journal of Farm Economics April, 1926, page 196. "A surplus considered from the standpoint of a market may, indeed must, be viewed, just as a quantity above normal or, second as a quantity available for export, or, third, as a quantity so abundant as to depress prices below a figure which will adequately reward the producers, whether or not it is below normal and whether or not any portion of it is exported." The first two of these concepts will be discussed later. The last brings in a more definite concept of the price which must be considered relative to a surplus. But what constitutes an adequate reward to the producers? If the producers are to be the judge, then this statement is of very little improvement on that of the desired price. Many statements of the surplus problem found in farm journals give a much similar definition of a surplus, but they attempt to define "adequate returns" as "cost of production plus a reasonable profit." Costs of production are made to include a fair rate of return on the investment and fair wages for the farmer's labor.

It should be noticed that there is a gradual shift of emphasis from one definition of surplus to another. The first applied mainly to a quantity of a crop or product, the latter places less emphasis on quantity and more on the return to the farmers. Another definition is given by the committee appointed to outline research projects for Agricultural Colleges. It includes not only quantity, price and returns to farmers, but also implies that the element of time, as well as the consumer has something to do with the problem. "The surplus with which agriculture is primarily concerned may be defined as follows: A surplus is a supply in excess
of the quantity which can be sold at a price sufficient to induce farmers to attempt to produce that quantity. The following footnote was added as an explanation: "An equilibrium price is such a price as will induce producers to attempt to produce a quantity exactly as large as consumers will consume at that price; a surplus is a quantity available for sale in excess of that which can be sold at an equilibrium price."

On the basis of this definition any increase in yields due to favorable conditions, is a surplus, as well as any lag on the part of producers in reducing the volume of production following a decrease in demand. This form of surplus should be self-correcting since if farmers continue to produce the same quantity as before, then there is no surplus except insofar as it occurs because production is not controllable. This definition makes the term surplus mean the same as production cycles*. The shorter the period of production, the more often the surplus occurs. We have therefore, cotton surpluses nearly every other year, hog surpluses about every three years and apple and horse surpluses about every seven to nine years. High prices act as an incentive to increase production with the result that very shortly, depending upon the length of the production period, prices are low and production must be curtailed. Such cycles seem to perpetuate themselves. Cyclical periods of production occur for most farm products as well as many other products, but since the high point in the cycle for all products did not occur in 1921 most people in talking about the agricultural surplus must refer to something different than cycles of production for individual products.

* National Problems for Cooperation, Agricultural Experiment Station and United States Department of Agriculture, Revised edition, January 15, 1927.
This definition of equilibrium must necessarily refer to conditions approaching free competition, because even under monopoly conditions the producer may more than cover costs and still not be induced to continue producing the same quantity, because he can make larger profits by producing a smaller quantity. The committee in elaborating on its definition of a surplus states that, "not only is it possible to have a surplus of a given crop or product, but it is likewise possible to have a general surplus of the total agricultural production over a period of years. This was the case during the eighties and nineties of the last century. American agriculture was over expanded, and as a result, the excess production resulted in continual low prices. Not only were prices low in America but due largely to American production, world prices of the leading commodities were low. Prices were not sufficient to induce farmers to continue indefinitely to produce at the inadequate returns received, though it took several decades to effect a readjustment. Thus there was in a real sense a surplus for a long series of years." It was previous to this period that the fertile regions of the middle west were opened up largely on account of the government's free land policy. Due to low prices many Eastern farms were abandoned and farmers in England suffered severely. The producers in old regions could not profitably produce and make returns on old capital values. Agriculture as a whole did not contract but continued to expand up to 1920. This fact would indicate that there was no general surplus and that farming was a profitable business. This cannot be called a real surplus from a social point of view. All the things that go to make up progress such as new inventions, improvements in technique, transportation, etc., cause shifts in
in production and reduce capital values of the old factors employed as well as lower prices. Producers using old methods will not continue indefinitely, although they may as long as the capital committed to the process yields anything above variable costs.

The opening up of new regions to farming has the same effect on agriculture as the invention of new machines or improvement of technique has on manufacturing. Such conditions will exist as long as the entire world is not settled. Discovery of new plant varieties or a change in technique likewise causes variations in costs and prices. No one would call the invention of a successful cotton picking machine an agricultural surplus, even if it should result in continued low cotton prices for decades. Although the western farmers did not make big immediate incomes between 1875 and 1900 their total returns were in many cases large, because of increased land values. The costs of production in this region were low and therefore price was low over the whole world. No doubt the expansion in this area was very rapid and insofar as a slower expansion would have given society a larger total supply of all goods over the period considered, there was a surplus from a social point of view.

The opening of new areas or rapid change in methods of cultivation is sometimes referred to as episodial surpluses. It may happen that capital and labor applied to production in the new area so rapidly that not only do the old areas suffer, but the new area does not receive returns on the effort directed into production. If the gains to society from the low prices are less than the losses to the old producers, and also losses or gains to
new producers, then there may be a surplus from the social point of view. If the consumers are mainly in another country or what might be called another society, then there is little or no chance for the losses and gains to offset one another and surpluses may exist from the point of view of one country but not from another. With the development of Brazil, coffee production was expanded to the point where producers received very little and other countries gained by cheap coffee. The same is true for plantation rubber. The production period for these commodities is relatively long, therefore the chance for maladjustments is greater. The condition was somewhat similar when wheat farming flourished in the central part of the United States, later in Canada and more recently in Australia and Argentina. The present cotton and rice situation in the United States is partly due to similar causes. Cotton farming has moved west into Texas, and Oklahoma, where it is carried on by large scale methods and in spite of low prices the new producers can make it a paying business. Older cotton producing regions find it almost impossible to compete with the new areas. Rice production has likewise been transformed by large scale methods, so that the United States has shifted from an import nation to an important export nation. These cases however, differ materially from those of coffee and rubber, because the new area in cotton is comparatively small and competes with older regions in the same country rather than in another country. In the case of rice, the United States furnishes only a small part of the world exports.

Practically all types of discoveries, inventions, and improvements that do not take place gradually, harm or appear to
harm some small group in society, while society as a whole tends to benefit. The old type of weavers in England never recovered from the effects of the introduction of machinery. Many new inventions have been attacked by laborers in that field. Early spinning machinery was often destroyed by groups who suffered from its competition. Farm laborers in the United States are reported to have attacked the first grain binder because it took away their jobs. Likewise new areas or new methods in agriculture cause hardships for old areas. Such disturbances during the recent period in which there has been so much talk about an agricultural surplus.

The last two definitions of a surplus are attempts to compare the incomes of farmers, as a group, to other groups in society, or of one group of farmers to another group of farmers. The first of these concepts involves the question of a maladjustment between agriculture as a whole and other industries and the second a maladjustment between different agricultural products. Either one of these maladjustments may exist without the other. In most writings about the present problems the first of these two concepts seems to prevail, but because it is almost impossible to accurately measure the incomes of farmers as compared to incomes in other groups, and little or nothing tangible to attack as a remedy for the supposed evil, discussion invariably shifts perhaps unintentionally or even unknown to the second type of maladjustment. In this case the low price for specific crops appears to be the real source of the trouble. The remedies proposed for the first type of maladjustments, by artificially raising the price of some of these products and not of the others, can not help but increase the second
type of maladjustments. No doubt both of these problems exist in the United States, the first one is present all the time in a small degree, and seems to become greater periodically. The second one exists all the time, especially for individual farmers but may become a problem at certain times for a whole group of farmers.

There are several other concepts of a surplus practically all of which are to some extent involved in those already considered. The essential differences depend on the extent of the market area and the period of time involved.

A surplus is often defined as a quantity above normal, of what is practically the same thing, a quantity above the average. Normal, sometimes means the usual quantity or quantity that was produced at some previous time which is considered as stable. The statistical measures of "normal" are some form of a trend line fitted either mathematically or by free hand to past data. A trend line or normal, tends to make allowance for continual growth or change in one direction, such as increase in population or in continued rise or fall in quantity. A statistical normal of this kind, although being the best fit to the data mathematically, may be either too high or too low as judged by some other concept of normal. For example, if wheat farmers do not shift to other products until they are forced to by low yields from single cropping or rising costs, they may always lag a year or two behind in the combination that would have given them larger returns. Any line fitted to past data would be higher than a line would be if the farmers had had a better combination. The only production that would result in surpluses according to the mathematical concept of normal are the yearly variations, due mainly to weather, and the cyclical movements due to lag or over response to price changes
and estimation of future opportunities. Surplus is sometimes spoken of as an excess over consumption or as an excess over needs. As far as the present problem is concerned these concepts are of little significance. Even though the product may all be consumed, it may be used for purposes which could be better satisfied by other means. To say that there is no surplus of corn or wheat, because it is all used up, is hardly relevant to the present problem. Corn may be used as fuel in place of coal, and wheat largely consumed by animals rather than people. Likewise to say that there is no surplus of products because there are always some poor and needy members of society, has no direct connection with the present problem.

Surpluses are sometimes referred to as local market or regional surpluses, as well as seasonal or temporary surpluses. The first of these are identical with the exportable concept first mentioned, except they refer to a smaller market area than a nation. If we began with the smallest unit — a farm, historically at least, it tended to be both a producing and a consuming center. Any quantity above its consumption requirements was an exportable surplus to be exchanged for other goods. Similarly with present local needs, is an exportable surplus, to be exchanged with other local markets. The area or region included in the local market depends mainly on the relative costs and value of their product as compared to the possibilities of transport to other regions. Perishable products can not be moved because they deteriorate, likewise bulky products, as hay because of the cost. Improvements in transportation as well as methods of preservation tend to extent the size of the market. Fresh fruits and vegetables bear
the same relation to an individual city market as potatoes do to the whole United States as a market or as wheat does to the world market. Seasonal surpluses are usually referred to in connection with those commodities produced only at certain seasons, and in so far as this is inherent in natural causes, they are of no interest here. The term seasonal or temporary surplus is sometimes used to describe variations in production, or sale of those products, the production of which is fairly continuous. For example, dairy products and eggs are produced in greater quantity during the spring and summer than during the rest of the year. These variations are largely due to the physical nature of the production elements involved. Conditions of this kind are corrected to some extent by shifting production to other periods of the year, and by storage facilities for holding the product over from one season to another. The problem here is almost identical with that of holding crops from one year to the next, except that the future production of these products is not so dependent on weather conditions, and future supplies can be foretold more accurately. A temporary surplus is often referred to when the conditions are such that an unusual quantity comes on the market in a relatively short period of time. Individual producers or groups of producers may ship so many carloads of fruits, vegetables or animals into one market at a given time that the price becomes depressed and the producers receive less than they would have if the shipments had been distributed more evenly either as to time and other markets or both.

Through all these various concepts of surplus is implied some definite relation between the quantity and the returns to the
producers from that quantity. It is generally accepted that larger quantities bring lower prices per unit of product, but this may mean either larger or smaller total returns, depending on whether or not the increase in quantity more than offsets the decrease in the price per unit. In many cases the increase in quantity does not offset the price per unit so that the total returns are less for the large supply. This relation tends to be the same for local products in local markets as for products of national scope in the national market, and products of world importance, in the world market. More fruit often brings smaller returns to the producers supplying the local market; a greater quantity of potatoes often brings less returns to potato producers of the United States; more wheat often brings less returns to all wheat producers of the world. This has led to a popular concept that it brings smaller total returns, than a smaller quantity would bring. This relationship between quantity and returns is the basis upon which most remedies are proposed for the present agricultural depression. It is also the basis on which organization attempts to reduce production so as to increase price and returns. The question of storage from one year to the next very largely depends on the same relationship. Carrying over part of a large crop from one year, and adding it to a short crop the next year, may bring less total returns for both years than if each crop were sold the year it was produced.

Most producers are not interested in total returns from the crop or product but rather in large net return. Net return
as here used refers to return above costs. This relationship of quantity to total returns and net returns involves the concept of "monopoly price". The second part of this thesis will explain briefly the theory of monopoly price and then apply the analysis to the available data for a number of products.

Closely related to the above concept is that of an exportable surplus. Since the United States normally produces more of many products than is required for domestic use, there is always an exportable residue. This quantity is attacked as the supply which increases the total volume of production to the point where the total returns are less than if a smaller quantity were produced. These exports prevent tariffs on imports of the same commodities from being effective in raising domestic prices above world price.

Most farm relief measures aim at changing the above relationships between quantity, price and effectiveness of tariffs, by increasing the export. This would raise the domestic price, while world price would be lowered very little so that the total returns from the quantity produced would be greater.

Part III of this thesis will show the trends in production and exports, and explain briefly the reasons for producing more or less than domestic requirements of certain crops. The economic theory involved is called by various names, but is generally spoken

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* The term "net" is also used to mean the largest return to all factors employed in the production process. This includes wages to the largest number of laborers, interest on largest amount of capital, and rent on largest amount of land that can be used in the production of any product or group of products. The term "net" so used is equivalent to costs. The quantity that will bring returns large enough to cover the costs is the same as the quantity that would be produced under competitive conditions if there were no maladjustments.
of as "The Principle of Comparative Advantage". Part III will explain this principle briefly and also the reasons for and the effect of governmental interference with the free action of economic forces.

Part IV will deal with agriculture in general, that is what might be called a general agricultural surplus. There is no doubt but that the main question at present is the relative well being of the agricultural class as compared to the relative well being of other classes in society. Several attempts have been made to measure the incomes of farmers as compared to their income in the past, or as compared to the incomes of other classes in society. This section of the thesis will deal mainly with the various indexes of farmers' incomes and an analysis of these measurements.

Part V will attempt a critical analysis of the important proposed remedies in view of the analysis in Parts II, III and IV and also in light of a few similar attempts by other governments to control somewhat similar situations.

In conclusion to this section of the thesis, it may be well to define a surplus from a social point of view, since that concept has often been referred to and all definitions given or quoted have been criticized.

A surplus is that part of the economic goods* or group of goods that is produced by productive effort which could on the average be employed to a greater advantage in the production of some other economic good or group of economic goods.**

* Goods is here used to include services as well as physical products.
** This definition has the same meaning as the classical definitions of normal price.
This definition fits the group irrespective of the size of the unit considered as a society. The individual farmer has a surplus of wheat, if he could have made a larger income by growing less wheat and more of some other product. This nation has a surplus of wheat if it could have obtained a larger income by producing less wheat and more of some other product.

There is a world surplus of wheat; all people taken as one society would have made a better income if some of the productive effort had been directed into other lines. The words "on the average" are inserted so as to eliminate the variations caused by unforeseen and unpredictable circumstances. It is to the interest of society to have such an acreage of a particular crop planted so that on the average nothing could be gained by putting effort into this line of production. Large yields per acre are therefore excluded from this definition of a surplus and a greater production from increased acreage may or may not be included depending on the circumstances.

It should be apparent that according to this definition a surplus constitutes a loss to society, not an absolute loss but rather a reduction in the possible returns, and that a surplus, in one line is equivalent to a defect in some other line.

There may be surpluses to individual members of society or producing units and yet not a surplus from a social point of view, for example, one farmer raises more wheat than the amount that would give him largest returns, another farmer less wheat, one manufacturer makes too many low shoes, another not enough, with the final result that the proper balance between lines of production is still maintained but the total product is less than if the productive effort had been applied differently.
PART II.

SURPLUS AS A QUANTITY THAT REDUCES THE TOTAL GROSS
AND THE TOTAL NET INCOMES FROM THE CROP.

This concept of a surplus is very popular and appeals
to many people. It is usually stated in reference to total
gross income and not in relation to total net income. Mr. B. B.
Smith in addressing the American Institute of Cooperation last
summer attracted a great deal of attention when he stated that the
smallest cotton crops on record returned more to the producers
than the large crops. The size of a crop that would bring the
largest gross or largest net income to producers under given cir-
cumstances is essentially the same quantity that would yield a
monopolist the greatest revenue. That is, the number of units
times the price or profit per unit that yields the largest gross
or the largest net income.

This concept of a surplus will first be considered from
a purely theoretical point of view and then the principles involved
will be applied as nearly as possible by use of statistical data to
a few specific crops. The quantity that will bring the largest
gross income depends on the demand for that commodity. The quantity
that will return the largest net income depends not only on demand
but also on the costs of production.

Demand may be defined as the amount of any product that
buyers stand ready to purchase at a particular price and at a given
time and place. A series of such quantities is known as a demand
schedule or more often simply as the demand. A change in demand
means a whole new schedule, parts of which may coincide with the
old schedule. Costs can not be defined as easily because considerable confusion exists as to what constitute costs in any industry, but more especially in agriculture. Costs will therefore be explained more fully later. The term "costs" as used in the first illustrations may briefly be defined as the alternative use value of the various elements used in the production of that commodity.

Let us first take a simple case in which we assume costs to be constant and demand to be represented by a straight line. In Figure I, DD represents a demand schedule and distance OC costs per unit of product. Obviously costs have no direct influence on quantity that returns largest gross income. According to a simple theorem of geometry the largest rectangle that can be inserted in a right triangle exactly bisects the sides. Price times quantity represents gross income. From this, it follows that one-half of the quantity that would bring the demand curves to the base line, selling for one-half of the highest attainable price per unit will give the largest gross incomes. This is represented by the rectangle OPXG or the quantity OQ selling at a price of OP per unit. Under conditions of free competition, the quantity OQ would tend to be produced, selling at cost or OC. This quantity would bring no net income or profits. If a larger quantity than OQ were produced the price would fall below costs and some producers would be forced out bringing the quantity back to OQ. If less than OQ units were produced, the price would rise above costs and make it a profitable business for new producers until the quantity increased to OQ, except under some degree of monopoly control. By monopoly, is here meant, the power to regulate supply so as to control price.
Under such conditions, it would be advantageous to the monopolist to cut the quantity to the point where the number of units, times the profit per unit, equals the largest total profit or net income. This is represented by the rectangle CP'YB which is obtained by ON units (\( \frac{1}{2} \) of OQ units) selling at a price of OP'. In this case the monopolist would produce only one-half of the amount that would be sold under free competition. This is only true with a straight line demand curve which is far from reality since most demand schedules plotted on ordinary graph paper are not straight lines and therefore the monopolists would produce more or less than half the quantity produced under free competition, depending on the slope and shape of the curve. This must be kept in mind in interpreting the conclusions drawn from Figures 3 and 4.

The slope of a straight line demand curve has no relative effect on the amount that would give the largest gross or largest net income. D'D' represents a more unelastic demand, meaning that the same absolute amount of the product will be associated with a greater absolute change in price. There is still a right triangle and therefore the largest gross income would be obtained by one-half of the quantity for which the demand curve reaches the base line. The largest net income would be one-half of the quantity OQ, or the amount that would be sold under free competition. The largest net income would be represented by rectangle CP''Y'B'.

It is often stated that elasticity of demand is one of the important things determining the power of a monopoly to fix price. This statement is true in a general way but it is rather the relative elasticity of the different parts of the demand curve.
In Figure 2, DD represents a demand curve of an elasticity that is usually spoken of as one or unity*. A given relative change in quantity is associated with a similar inverse relative change in price. This relationship is the same for every part of the demand curve. If such a demand curve is plotted on double logarithmic paper it becomes a straight line. With this type of a demand curve, any quantity would always bring the same gross income. OQ units would sell for a price of OY' returning a gross income represented by the rectangle OY'YQ which is equal to any other rectangle for example, rectangle OCAQ' or quantity OQ' selling at a price of OQ.

If we let OC represent cost per unit, then under price competition, the quantity OQ' would be produced and sold at no net returns. Under monopoly conditions a smaller quantity of any magnitude would always bring a larger net income. Of course it becomes absurd to think of one unit bringing the largest net income, but this is because the relative elasticity of the curve changes in different portions of the curve, and a halving of the quantity no longer causes a doubling of the price.

D'D' represents the same type of a demand curve, drawn so that any quantity would always bring the same net income, or no quantity could ever be large enough to bring the largest gross income. This is also an impossible condition, because relative elasticity of the lower part of the demand curve always changes and costs eventually increase.

* Alfred Marshall "Principles of Economics" page 102, Ibid page 839. Marshall calls this particular type of a curve "a constant outlay curve".
In the case of an increasing cost good as represented in Figure 3, there is no new relationship involved in the concept of quantity bringing the largest gross income. This is represented by the quantity OQ for the same reasons as already explained. In the case of the largest net income, the problem is a little more complex because rent which is a surplus above costs must be regarded as part of net income. Let line CO' represent the marginal costs or in other words, the cost of the added units of supply. If costs are increasing, the additional costs will increase more rapidly than average costs. Average costs are represented by line CO''. Under conditions of free competition, there will be a tendency for OQ units to be produced selling at a price of OP'. It is the cost of producing the marginal or added unit, which tends to equal selling price and not average costs. The term "average costs" must be understood to mean "costs" other than "rent" in this case. The concept of average costs will be explained more fully in connection with Figure 6.

To make the illustration here more concrete, let us say, it represents a crop produced on poorer and poorer grades of land. Then the land producing the last additions to quantity OQ, would receive no rent, because price is just equal to the variable costs of production. If land still poorer than this were used, prices would not cover variable costs. With quantity OQ produced, triangle OA'Q would represent costs, and triangle OP'A' would represent rent on better grades of land. This can also be represented by using average costs, then OE represents average costs of producing OQ units and EP' average rents. Rectangle OEFQ represents total costs

* The lines CO' or CO'' do not represent different costs to different costs to different producers at one time or what is known as a "differential cost curve". Line CO' represents the variable costs per unit of product as supply is increased. Line CO'' represents the average of all variable costs per unit to produce a given supply.
and rectangle EP'A'F total rents. These rectangles are exactly equal to the triangles mentioned above. From the above discussions it should be apparent that it is the marginal cost that tends to correspond to the selling price and that, if we try to discover marginal costs from statistical data, rent must be included as a cost. (The question of what rent to include will be discussed later). The marginal costs of producing quantity OQ is equal to the average cost other than rent plus the average rent.

This same diagram could be interpreted as referring to a particular piece of good land. The marginal cost line would represent

* From the above diagram, Figure 3, it appears that it is the arithmetic average of costs (average rent plus average variable costs) that tends to equal marginal costs and selling price. This seems to conflict with the more accepted theory, that it is the bulk line costs or costs to representative firms that equals selling price.

There is no real difference. The bulk line, or representative firm analysis, does not include rent or profits to superior firms as a cost. Especially in agriculture, profit differentials on low cost farms, tend to be considered as rent and capitalized into land values.

If the data collected on costs of producing certain crops included only the correct rent chargeable to that crop, then costs to the bulk line producers would equal selling price and this cost would also tend to be the average cost of production, including rent. Since cost data usually include rent on all land, marginal and submarginal which should have no rent, and often too high a rent on the better grades of land, the average costs of production (including rent) are apt to be higher than the selling price. Such data may show that the bulk line producers do not cover costs. In every case it depends to a considerable extent on the shape of the distribution of the cost data collected. A highly skewed distribution may mean that the average costs (including rent) are either too high or too low depending on which way the distribution is skewed.

If average costs of production including rents could be accurately calculated, there would be very little range in costs and all three, average costs, bulk line costs, and marginal costs, would tend to be equal, and all of them equal to the selling price.
the cost of the product, in terms of variable costs, any farmer would tend to add labor and capital to the land until the last unit just paid for itself. The appreciation of the labor and capital which just pays for itself is often spoken of as "the intensive margin of cultivation" as compared to similar applications on poor lands which yield no rent as "the extensive margin of cultivation."

In Figure 3, if the production were under monopoly control, the largest net income rents and profits would be obtained by producing ON units selling for a price of OP'. Net income being represented by rectangle HP'XB or by trapezoid OP'XM. This is a larger quantity than one-half of what would be sold under free competition because the gain in profits is partly offset by loss in rents as production is curtailed. It is one-half of quantity OQ whose selling price would just equal average costs other than rents.

The largest net income is obtained by the same procedure as before. The large triangle ODA is divided into two right triangles, OPA and PDA and the largest possible rectangles HPMB and PP'XM inserted in each respectively. These two rectangles equal the rectangle HP'XB or the largest net income.

Perhaps under conditions of free competition more than the quantity OQ will tend to be produced reducing selling price below marginal costs. This must be what many people have in mind when they speak of a surplus. This involves two kinds of surpluses, one due to too much product because too much land is devoted to a particular crop or land is farmed too intensively and secondly because the quantity varies from uncontrollable conditions and the attempt to produce the quantity OQ results in a much larger quantity,
because of very physically favorable weather conditions. Either or both of these may be brought about or accentuated by a falling off of demand.

Agriculture is so commonly interpreted as being an industry of increasing costs, that few people recognize the part that decreasing costs play in relation to variations in yields. When the terms "increasing" and "decreasing costs" are used they are usually treated in a very general way. Few writers make clear the distinction between increasing or decreasing costs, due solely to an increased volume at one time, and those changes in costs over a period of years due to inventions, improvements and discoveries. Viewed historically most manufacturing costs have decreased, due to changes in technique, improvements and inventions, but the same is true of some agricultural products. New varieties and new methods associated with the opening up of new regions has decreased the costs of some agricultural products, and it would be safe to say, that taken as a group they have been produced at almost constant cost. The terms "increasing and decreasing costs" are sometimes used in forecasting far into the future and many people hold a more optimistic view for inventions and improvements in manufacturing than they do for agriculture.

Figure 4 represents decreasing costs for an industry as a whole due only to increased volume. The quantity OG would still give largest gross income for the same reasons as explained before. Line OG represents average costs per unit and line OG' additional costs per unit. (It just happens in this diagram due to drawing of average cost curve that largest gross incomes would be obtained by quantity whose average costs equalled selling price.)
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<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
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<th>10</th>
<th>11</th>
<th>12</th>
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<td>1</td>
<td>0</td>
<td>-1</td>
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<td>16</td>
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<td>10.91</td>
<td>10</td>
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**Inputs per Unit of Output**

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<th>0.156</th>
<th>0.132</th>
<th>0.104</th>
<th>0.094</th>
<th>0.088</th>
<th>0.085</th>
<th>0.085</th>
<th>0.083</th>
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<tbody>
<tr>
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<td>0.037</td>
<td>0.076</td>
<td>0.056</td>
<td>0.074</td>
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<td>1.428</td>
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<td>.5</td>
<td>1</td>
<td></td>
</tr>
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<td>Var</td>
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<td>1</td>
<td>0.696</td>
<td>0.625</td>
<td>0.610</td>
<td>0.625</td>
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<td>0.769</td>
<td>0.840</td>
<td>0.917</td>
<td>1</td>
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</tbody>
</table>

**Figure 5.**

The graph shows the relationship between inputs of variable and output, with different curves labeled M, A, and T, representing different stages or categories of input.
ON units would bring the largest net income represented by rectangle $P'P''XB$. This is equal to one-half of the quantity whose average costs would just equal the selling price. This is obtained by constructing rectangle $PP''XB'$ in triangle FDA and then substituting rectangle $PP'BB'$.

Under such conditions there could be no competitive price level. If new producers could produce cheaper than old ones or any of the old ones could increase their volume at reduced costs, all producers would either lose money or the most efficient one would drive all others out, or they would combine to form some degree of a monopoly.

Decreasing costs of this nature may be one of the reasons for many combinations in business. It is not the kind of decreasing costs that most economists have in mind, when they use the term. They mean changes in costs due mainly to external factors, primarily an increase in demand. Decreasing costs are in such cases not due solely to increased volume, but due to changes in a number of factors, over a period of time. At any given time production in representative firms is in a stage of increasing costs.

In order to differentiate the above concepts of increasing and decreasing costs from those actually involved in our present problem, we must explain briefly the principles underlying increasing and decreasing costs within any one plant or farm. To do this, we will follow the analysis in Dr. J. D. Black's "Introduction to Production Economics", Chapters XI and XII.

Figure 5 illustrates the principle which Dr. Black calls the "Principle of Diminishing Physical Output", Alfred Marshall "The Law of Proportions", and to which others apply.
various names but most commonly the "Law of Dimishing Returns". Briefly stated, it means that as the proportions in which the elements of production are combined are changed, the product expressed as output per unit of any of the factors, increases and then decreases. For simplicity, the proportions are expressed as one unit of one or more factors to increasing amounts of other factors. Figure 5 assumes only two factors combined in the proportions 1:1, 1:2, 1:3, 1:4, etc. The factor which remains constant in amount or decreases in the proportion is called, "The Fixed Factor". The factor which increases in amount and also in proportion is called, "The Variable Factor". To make Figure 5 a little more concrete, let us assume that it represents hundred weights of potatoes planted on one acre of land. The curve labeled T represents output per acre, and 120 bushels is the largest amount that can be produced from one acre by changing the proportions of seed to land. The curve labeled A represents output per hundredweight of seed planted by changing the proportions between seed and land. The curve labeled M represents addition to total product, due to an added hundredweight of seed. By simple arithmetic, these relationships can be expressed as input per unit of output. If one acre produces 120 bushels, it takes only 1/120 or .0083 acre to produce one bushel of product, 16.4 bushels, it requires 1/16.4 or .061 hundredweight to produce one bushel of product, and where another hundredweight of seed is added 23 bushels, it requires 1/23 or .0437 hundredweight to add one bushel.
In reality every production process requires more than two elements of production. This does not change the principle but only tends to make a graphic representation impossible. The relationship of two variables and one fixed factor could be shown in a figure of three dimensions but it would be impossible to graph the conditions where there were three or more independent variable factors. This physical principle applies to all types of production processes, manufacturing as well as to agriculture, and is the basis of decreasing and increasing costs within any one plant or farm at a particular time.

Figure 6 represents the same thing as Figure 5 except costs of one dollar per hundredweight and one dollar per acre have been applied. (One dollar was used because it leaves the decimal numbers the same, for example, .061 hundredweight at \$100 = \$ .061). Costs per unit in terms of a fixed factor decrease as long as more product is obtainable from that factor, which in this case is 120 bushels. Costs per unit in terms of the variable factor, decrease as long as output per unit increases, so in this problem an output of 82 bushels could be produced cheapest in terms of seed. The combined costs per unit decrease to some point between lowest cost in terms of the fixed factor and lowest costs in terms of variable factor depending on relative costs of the factors, in this case to 7.3 cents when 97 bushels are produced. Effects of different costs units can be illustrated by assuming a selling price of 10 cents, then the producer would make the largest profit by adding seed until the last unit just paid for itself, where variable
costs per unit of added product equal the selling price as is illustrated by the dotted line. This would be a total of 106 bushels produced at an average cost of 7.6 cents or an average profit of 2.4 cents, or a total net income of $2.544. If all of this profit is attributed to land as tends to happen under conditions of competition for good land, the rental value would be increased from $1.00 to $3.54. Applying this cost to land, increases the per unit cost in terms of land as is indicated by the dotted line. Adding this to the cost of variable factors would make combined costs decrease until 106 bushels were produced and then increase, combined costs now being 10 cents at 106 bushels or the only point at which produce can break even at a selling price of 10 cents. If no rent land were used, costs of seed would be only costs and produce would break even at a selling price of 6.1 cents by producing 82 bushels.

This tendency to capitalizing net returns into rents or values of fixed factors, tends to make all produces operate to the least cost point or at a point where combined costs began to increase. But it must be remembered that the costs of the fixed factor so attributed are not really costs but surplus revenue above costs of the variable factor capitalized into a value or cost for the fixed factor.

The same principle applies in other industries as well as in agriculture. Let us take railroads for example, an expensive road is built and the combined costs are not covered so it goes bankrupt and is sold at a fraction of its original cost. The new company covers combined costs at the same prices
for the services as before. The same result might have been obtained by increasing the prices for the services so as to cover costs for the original owners. This would make the public pay continuously for the mistakes of those who constructed the railroad. They built too expensive a road or located it in the wrong place. The first method puts the loss on the people who made the errors.

On the other hand, if the road were so built that it returned a profit above combined costs, then this profit would be capitalized into the value of the road and the price of stock would increase.*

To some extent, the same conditions apply to rent as a cost. If land is over capitalized or if some person spends more on clearing and bringing a piece of land into cultivation than it is worth, there is no reason why the public should set the price of the product so high that these costs are covered. We are now ready to analyze the relationship of increasing and decreasing costs as it applies to any given crop at a particular time. If the producers try to produce more of a crop, they must either use poorer land on which costs are higher because the same amount of labor and capital yield less product, or they must apply more labor and capital on the same land and that likewise gives less produce or higher costs. In other words, marginal costs increase as the producer tries to increase output. If a farmer applies labor

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* All or part of these profits may be taken by the government as provided for in the recapture clause of the transportation act, or rates may be reduced so that the price of the stock does not increase.
and capital in producing potatoes until he calculates that the last units applied will just pay for themselves at a selling price of 50 cents per bushel and a yield of 100 bushels, per acre. Then he will just break even including rents, providing the price and yield are as expected. If he thinks that the price will be only 45 cents he will apply less labor and capital producing less bushels say 90, but still the last units of labor and capital applied will just pay for themselves at 45 cents. His total costs including rents will be 90 times 45 cents or $40.50. If the price were 55 cents, he would add more labor and capital, but only until the last unit just paid for itself. If this were at 110 bushels per acre the total costs including rents would be 110 times 55 cents or $60.50. After the farmer has applied these costs, they are really fixed costs and if he gets the expected yield and expected price, he will just break even counting rent as a cost. But what usually happens is that rain, hail, frost, insects, sunshines, etc., cause wide variations in yields and consequently prices also change. For example, if the farmer has expended $50.00 (counting rent as expense), anticipating yield of 100 bushels and then only receives 50 bushels, his costs per bushel will rise to approximately $1.00 or if he receives a bumper crop of 200 bushels, his costs per bushel will fall to approximately $.25. These would not be exactly correct because with a small crop some harvesting and marketing costs are saved while with a large crop, these are increased a little, so total costs would not remain $50.00 if the yield changed but would be very close to it.
This is illustrated in the form of a diagram in Figure 7, by using the three sets of total costs explained above and a variation from expected yield of 50 per cent either way. Line CO represents the increase in costs, from attempting to produce more product, and lines XX represent costs per unit of product, due to variations in yield on account of weather and climatic conditions with different degrees of intensity of cultivation.

The problem whether farmers lose money on large crops depends on the relation of this cost curve to the selling price or demand curve. The same relationship can be shown and perhaps more clearly, by use of total costs in relation to total returns from the crop. The total costs of producing a normal quantity is made up of a number of costs which may be classified as fixed and variable costs. The fixed costs include practically everything except harvesting and marketing costs, and also some of these. The variable costs are those that vary in total amount, as yield varies, or those which are almost proportional to yield. For example, threshing costs of grains are usually so much per bushel, and corn husking and potato picking are very often paid for on a bushel basis, and these costs tend to vary proportionally with the yield.

When the middle curve in Figure 7 is converted to a total cost basis it tends to become a straight line, the slope of which depends on the proportion of fixed costs to variable costs. For the purpose of illustration, we may assume that variable costs are one-fifth or two-fifths of the total costs of producing a normal yield. Using the same cost per bushel of 50 cents at this point, we can construct the following table...
of total costs due to variations in yields.

Table I - Change in Total Costs due to Variations in Yields

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<th>Yield per cent of normal:</th>
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Figure 8 constructed from this table shows two total cost curves with acreage constant but different proportions between fixed and variable costs. Regardless of slope, the extra costs due to large yields, are offset by the decreased costs on small yields. Therefore in considering losses and gains from variations in yields it is not necessary to know the slope of the line in making the comparisons. As long as it is the relative losses and gains from large and small crops that are significant, the same conclusions are obtained by considering all costs as fixed when acreage is fixed and representing them by a straight line parallel to base line as if the slope of the line were determined. It is the comparison of this line to the line representing the total value of the crop that shows the effect of surpluses due to large yields on the returns to farmers and this type of analysis will be used for individual crops rather than comparing per unit costs with per unit selling price.
We now have really three different surplus problems instead of only the one we started out with in this part of the thesis;--that of the relation of the size of the crop to the total net or gross income. This is not really a problem from a social point of view, except in so far as it involves the other two. There is the problem of intensity that is; are the producers intensifying or using land for this particular crop so that the average yield and acreage is greater than it ought to be? In the terms of Figure 7 is the yield 100 bushels when it should only be 90? The other type of a surplus is that due to the variations in yield.

In order to apply the preceding analysis to any particular crop, it will be necessary to construct some form of a statistical demand curve for that crop and also a cost curve showing the total or the per unit costs as supply changes.

It is impossible to obtain a statistical measure of demand as defined on page 21, because there is no way of obtaining data concerning what buyers stand ready to take at a series of prices at a particular time and place. The closest approach to this is a curve representing the history of equating prices in the past. This necessarily involves some form of an average price for the year or periods taken as well as an average for several places or markets.

The ideal price for this study would be a properly weighted average farm price because we are interested in returns to producers or growers and not the returns to all who aid in supplying the wants of the consumers of that commodity. Marketing and transportation costs take a larger portion of the selling price when it is low. Statistics for most crops both of productions and of prices are far from correct but since they are the best information available they will
be used in this analysis. Many of the figures could be refined and corrected but the additional accuracy would not warrant the time and effort required. The price series of production estimates used come near to being what would be ideal if all data wished for were available. Because of changes in value of money, all prices in the past must be deflated to put them on a comparable basis. No index number is infallible but all tend to show the same major variations.

A curve fitted to equating prices in the past would represent the demand at any particular time if deflation of prices exactly corrected for the changes in the value of money; providing also that there were no real changes in demand during the period and that there were no other intervening causes. These conditions are never exactly fulfilled either or both supply and demand may change so that this type of a curve only approximates a demand curve.

Since such curves are the best approximations possible, they will be used in this analysis. The demand curves used are taken from other studies and are fairly accurate, but the limitations must be kept in mind in interpreting the conditions.

From a statistical demand curve nothing is known about the shape or slope of the curve for prices higher than those obtained from the smallest volume on record, or lower than those from the largest production on record. There is nothing strange then in the fact that for some crops the smallest supply in the past has brought both the largest gross and largest net income.

This can be made clearer if we refer to Figure 3. In such a

highly competitive industry as the raising of a particular crop for example, cotton or potatoes the quantity \( Q \) tends to be produced and perhaps on no occasion has a quantity as small as \( Q \) or \( 2Q \) ever been produced so that the smallest crops have always brought the largest incomes. This makes it impossible to determine what size of a crop would bring the largest gross or the largest net income.

From a social point of view, crops larger than those bringing the largest income are not a surplus unless they reduce price so low that there is no net income or an actual loss to the producers of that crop, and further that this loss to one small part of society larger than the gain to the rest of society from receiving cheap commodities.

Most people will admit immediately that monopoly control or monopoly price is not socially desirable in most cases. Here is a case where the individual and social interests are nearly in harmony, while that of the producers of one crop as a group is directly opposed to that of society. If the producers of a particular crop could control production, they would receive largest income by limiting the crop to approximately one half of its present volume, more or less than half depending on the shape and the slope of the curves. In this way they would gain as a group at the expense of the rest of society. That such a condition is undesirable is obvious to many people. It can easily be demonstrated by reducing it to absurdity. If one group cuts productions in half, they only gain as long as others do not follow suit. If some or all other groups do likewise, the demand for the first commodity is lowered, and they no longer receive the largest income but would receive it by again cutting supply in half. This would lead to the progressive cutting of supplies of all commodities
until total production approached zero. If the producers of wheat, cotton, corn, potatoes, shoes, machinery etc. all tried to increase returns to themselves by reducing the volume, there would be just as many people as before and a smaller number of units of goods to go around.

Under the conditions of competition the individual producer can obtain the maximum income for himself by increasing his yield and acreage because his production is so small in regard to the total supply which determines the price that it has very little effect on the selling price. But even unregulated competition in the field of agriculture may not be the best for society, if it causes the application of productive effort in lines where it brings less returns to society than it would in other lines, or if it causes wide variation in supply from times of oversupply to periods of scarcity. Perhaps some form of regulated production which keeps the supply near to the theoretical competitive normal would be desirable. Beginning with the Classical Economists competition was looked upon as the best regulator of supply and price. Up until the 20th century it was held for all kinds of goods and services. Opinion has since changed especially in the case of railroads from one of preventing combinations to forcing combinations and then regulating prices. The present discussion about surpluses seems to indicate that competition does not function perfectly even in case of increasing cost goods and that some form of regulation through cooperatives or group action is desirable. Congress at least has recognized this in changing the laws so as to exempt cooperatives from the provisions of the Anti-trust Laws.

It should now be apparent that the size of the crop that brings the largest gross or largest net income is only of importance
from the point of view of the producers as a monopolist unless due to the relations of demand and costs, it comes very nearly being the same quantity that would just cover costs.

The problem of the relation of costs per unit to the selling price involves not only a statistical demand curve but also data regarding costs. Data as to the costs of production are very meager and in most cases not very reliable. There are two possible methods of approximating the costs for use in this analysis, one of assuming that an average of past conditions represents fairly accurately the present conditions, and then by working backwards from price to costs, which amounts to saying that the trend in price equals the marginal cost of producing a normal supply as indicated by the trend in production. The other method is to take the figures collected by various agencies or those in United States Department of Agriculture year books and to accept the average cost per bushel or unit given as representing the marginal cost of production. Theoretically both methods should give the same results but practically one is apt to be too high and the other too low.

The first method of assuming that price equals marginal cost is apt to be too low, especially if there are some people farming no rent land. This is likely to be the case in new sections and in cases of rapid expansion. People settle the land and obtain a very low income. Alfred Marshall states that in many new regions the main product is the anticipated rise in land values and the crop produced is a by-product. The supply of these producers is thrown

on the market, and reduces the value of the whole supply. If such conditions have existed in the past and will not continue to exist, then costs obtained by assuming that the trend in prices equals the marginal costs will be lower than the present true costs. This is equivalent to assuming that there has been no surplus from intensifying too much or using too much land for this crop in the past. This method also has to assume that the gains or losses from a short crop exactly offset the losses or gains from a large crop, due to variations in yields so that the present trend in production correctly measures the size of crop that the producers would try to produce at expected prices. Such a method must include a long enough period of time to get about an equal number of short and large crops. But in taking such a period of time there may have been changes in demand and the failure of producers to adjust to these changes constitutes a maladjustment which may result in either a surplus or a deficit of that particular crop.

The advantages of this method are that it can be applied to almost any crop from the data available and that it gives fairly accurately the price necessary in the past to have induced producers to try to produce a certain quantity.

This method may also give results which are too high because during the period taken for analysis, there may have been a lag, producers not expanding this crop as rapidly as price has warranted, so that the selling price has always been a little higher than marginal costs.

The second method of obtaining costs is very apt to give results that are too high. Most cost of production studies have shown that crops are produced at a loss, either the farmer receives no rent
or his wages are very small. According to previous discussions, rent should be included as a cost in using average figures to determine marginal costs. But the question of what rent to include and what rent has been included in the studies already made, is very hard to determine for each crop. If all land were rented on a cash basis, it would seem as if this would be the correct rent to charge, but the problem is not as simple as this. Rents tend to become fixed either by habit, custom, or long leases, and for any one year or years included in the cost analysis, rents may be either too high or too low. Even if it could be said that the rents were properly adjusted for the farm as a unit, there still remains the problem of determining how much or what part of the rent should be charged to each crop if several are grown. Part of the farm may be in pasture or hay and rents for these crops should be less than for the main crop. Obviously the rent charged against oats in a corn, oats and clover rotation, should not be as high as that charged to the corn. Because the corn is the main product and the oats are very often grown as a nurse crop for clover which in turn is an aid in maintaining fertility of soil and yields of corn. Even if it is rented, land that has only one use say semi-arid land used for wheat, there is a question whether all or any part of this rent should be included as a cost in determining marginal costs of production. If it is necessary to use this type of land and on the average it produces a crop which sells for more than the sum of the variable costs, then rents on this type of land should be included in determining marginal costs for the average volume produced. That is, this rent might be part of the costs in the surplus problem, arising from variations in yields per acre, but it would not be a cost in determining the costs of producing a smaller average volume. The fact that the price does not cover costs when such
rents are included, cannot be taken as evidence that there is a surplus from using too much land for that crop. The land should be used for its best use as long as it covers variable costs even if it leaves nothing for rents. As long as the price covers the costs other than the rent on such land, there is no surplus from using that land.

Most land is farmed by the owner or title-holder and no rents are paid. Under such conditions, there is no competitive basis for determining what the rent should be or what it is. Theoretically it is what the land earns or the value of the crop above the variable costs. This difference is capitalized into the value of the land and on this basis many people say farmers should be entitled to a fair rate of interest on their investment. This is perfectly true, but it does not justify charging 4, 5, or 6% as the case may be of the value of the land as rent, because the value of land is based on the capitalized value of the expected increases in rents as well as the continuation of the present amount of rent. This has been demonstrated quite conclusively by studies of land values such as the one made by Clyde R. Chambers. To people who do not believe in statistical data, this does not prove anything but the same thing can be explained in a simple way. Land in northern Minnesota that produces nothing but brush is not free land, it has a sale value varying from a few cents to thirty or even forty dollars per acre. Such land is valued entirely on its future anticipated uses. Likewise land already in use has part of its value based on future increases in net rent. The part of the value of land due to anticipated future incomes, varies from the whole value to none of it in some sections. This increase in land value is often spoken of as "the unearned increment", especially by single taxers. If this

* Relations of Land Values to Land Income. United States Department of Agriculture Bulletin No. 1224.
expected increase takes place, the owner makes his fair return on his investment even though the cash rent on its equivalent amounts to only 2, 2½, 3% or nothing, as the case may be. Charging rent as a fair rate of return on land values always makes rent charges too high because in most cases people overlook the value due to the anticipated future earning power, and in other cases do not know how much of the land value is due to this factor.

The amount of rent chargeable to any crop becomes a very indefinite factor and almost impossible of determination for any one crop. It is quite easy to state what should be a minimum rent charge but it is very hard to determine it. The minimum rent charge for any crop should be the rent obtainable from the land in its next best use. That is, the minimum rent on corn land should be the rent this land can earn in its next best use, which may be wheat, sugar beets or some other crop. But of course this rent is likewise hard to determine. The minimum rent on land that has only one use would be zero. This is the rent that should be included as costs if one were making a comparison of costs of production of a particular crop in this country, with the costs in some other country. This is also the rent to be included as a cost in determining whether or not a surplus exists of a particular crop from trying to produce too great a quantity either by a high degree of intensification or by using too much land. If the land should have been used for some other crop or left idle (uncultivated) but was used for the crop in question, then a real surplus exists. This should be remedied by returning land to some other use, or taking it out of use, and not by raising prices to cover costs of past errors in judgment.

This minimum rent is not the correct amount to charge as
as a cost, in determining costs in relation to a surplus caused by bumper yields. The rent costs may be considerably higher than this, if conditions of demand are such that land of no alternative use must be cultivated and on the average yields a rent, and the better grades of land must be farmed more intensively and on the average return rents higher than those from its next best use, then these rents must be included as costs of inducing farmers to continue to produce that average quantity. When large crops reduce the price so that this rent which is not a cost from a social point of view, is not covered, there may be some actual loss to individual producers who have applied labor and capital to the point where they expected the last units to just pay for themselves.

Many producers have very little reserve capital for tiding them over such periods and the result is that they are forced out of the business. Others react to low prices by shifting to other crops or farming less intensively with the result that production is curtailed for the next year or two. This results in greater variation in the supply than those due solely to uncontrolable conditions.

From the foregoing analysis of rent, it should be evident that the rent charges included in cost of production studies are apt to be biased and therefore costs are too high. The same results are likely to be true in respect to wages of labor and costs for use of equipment but to a smaller degree.

If only one crop were raised and all labor devoted to it were hired, then it would be a simple task to determine labor costs of production, but since most crops are produced in connection
with other crops or enterprises and most of the labor is the farmer's own time or that of his family, it is very nearly impossible to determine specific costs for specific crops. What is a fair salary for the farmer? To many, it is his earning capacity in some other occupation. But it surely is not what laborers in the city earn per year, day or month because conditions are not similar as to the costs of living etc. Perhaps the farmer would rather live in the country and receive less wages than move to the city. The nearest comparative wage is that of hired farm labor which is hardly a fair measure because farmers work harder as a rule and take more interest in their work. But even aside from determining the yearly rate for the farmer or his hired help, there is the problem of dividing the costs between the various enterprises. Some crops require labor when the farmer is very busy, others claim only a part of his time when he has little or nothing else to do. Even if his farm operations are so scientifically planned that his labor is evenly distributed throughout the year, there is no reason for charging the same hourly rates to all enterprises. Charging a flat rate to all enterprises makes the cost of some products too high and others too low.

In the case of other family labor, the rates are still more indeterminate. In many cases, there is no alternative use for the labor. The children must be clothed and fed regardless of what their labor contributes to the crops. Very seldom can they hire out to neighbors and very few of them can leave and go to the cities. What is the cost in dollars for the time they
spend working? Perhaps in some cases it is even a minus quantity; the crop or enterprise should be credited with something. It keeps them out of mischief and teaches them to be industrious. City people are often troubled with finding constructive recreation for their children. They are often glad to send them into the country during summer months and to pay for having them kept there. To charge a rate of \( \frac{1}{2} \) or \( \frac{1}{4} \) of the man rate for the work performed by children gives a cost figure, but hardly ever the correct cost.

The same type of analysis applies to rates for use of horses and equipment for particular crops. The number of hours spent can often be fairly accurately determined, but it is very difficult to determine the rates per hour, or even yearly costs which involves depreciation, obsolescence, repair, upkeep and maintenance. It is a very difficult problem to determine how much a particular hour of time for a horse is worth when the farmer raises the horse and all the feed and takes care of it himself. Nevertheless in all cost of production studies rates have to be applied and with the multitude of problems involved it is rather surprising that they come somewhere near the truth.

In applying either method outlined for obtaining costs of production of any particular crop, the data will be used as it is now available, with little or no attempt to refine the figures. This means that conclusions must be interpreted with consideration of the limitations of the data. This analysis will be applied to a few specific crops to determine as nearly as possible the size of the crop that would
give the largest gross and the largest net income, the effect of large and small yields on net income and the question of overproduction of one crop from attempting to produce a given quantity of it. This last problem really involves a relative study between crops because overproduction of one crop means either underproduction of some other crop or a condition of general overexpansion of agriculture.
The Relation of the Supply of Corn to Returns.

This analysis of the size of the corn crop in relation to returns is based primarily upon a study of "The Factors Determining Corn Prices at Chicago" submitted as a Masters' Thesis at the University of Minnesota by Elmer William Braun in June 1926. Mr. Braun used the price quotations of number 3 corn at Chicago as the basis of his study because it was representative of corn arriving there, and the spread in price between grades was quite uniform. Prices are for the crop year from October to June and are deflated by the Bureau of Labor Statistics index number of wholesale prices for the same period to give the value of corn. This price does not exactly represent the value of the corn crop to farmers, but no doubt comes as close to representing returns to farmers as any price data readily available.

Mr. Braun tried out several ways of correlating price with supply, one of which, was the Per Cent of the Normal method which is used in this analysis. The validity of such a method depends primarily on the validity of the normal chosen. A statistical normal or trend line is not necessarily the same as the normal price or trend that classical economists talk about, but it comes as close to representing it, as is possible by the use of statistical data. Economists define normal price as, "that price about which market price fluctuates and at which market price would come to rest if forces had time to work out their full effect".* This is not a simple arithmetic average of market

prices because it makes allowance for continued changes in one direction. A trend line fitted to market prices or any other data over a period of time by some method of least squares or even drawn free hand to give the best fit to the judgment of the investigator is also not an average in the usual sense of the word. Nevertheless it is similar to an average, especially when a trend line is fitted by the method of moving averages. A statistical trend corresponds closely to the normal price referred to by economists, but may be either higher or lower depending on the period of time involved and the element of lag in making adjustments. Trend lines will be referred to as normals in spite of their limitations.

Figure 9 shows the average actual price and the average deflated price or value of No. 3 corn at Chicago from 1892 to 1925.

Figure 10 shows the production and total supply of corn from 1890 to 1925. The total supply was calculated as production plus visible supplies August 1st, and old stocks on farms November 1st. Visible supply is that quantity found in mills and elevators. This was taken as of August first, because about that time the new crop becomes the dominant factor affecting price. Old stocks on farms were taken on November first, because that is the only fall date for which data are available. The normal carry-over from one year to the next is approximately 1,000,000 bushels.

Mr. Braun fitted a normal or trend line to the value of corn at Chicago from 1897 to 1915 by the method of least squares.
PRICE AND VALUE, OR PURCHASING POWER, OF NO. 3 MIXED CORN AT CHICAGO
SINCE 1892, OCTOBER-JUNE CROP YEAR

FIGURE 10.

PRODUCTION AND TOTAL SUPPLY OF CORN SINCE 1890

(Y=58.03 - 1.1175x origin at 1906). This is shown in Figure 11. This gives a normal increase in price of 1.1 cents per year. The dotted extension of this line shows what prices would have been if conditions had continued after 1920 as they were before. The solid line from 1920 on represents a trend of the same slope but at a price of 26.4 cents less than the old normal.* The average of actual values for the six years is subtracted from the average of the extended normal, and this gives the basis on which the new line is drawn. This may not be the new normal price of corn, because the period is too short to be conclusive, but it is quite evident that the old normal does not hold for the present conditions. It is this drop in the general level of corn prices, that is the basis for the present grief of the corn farmers. Is it due to overproduction of corn, a change in demand, or some other conditions? Are costs of production still at the old level or have they fallen also? These points will be discussed later. For the present, we shall assume that the new line represents the present normal price of corn.

Figure 12 represents the normal supply of corn in the United States. This line was fitted free hand. It shows an increase in supply at a decreasing rate since 1892. The 1920 and 1921 crops were very large, but not large enough to account for the great fall in price. The very short crop of 1924 was not small enough to bring the price up to the old level.

* This line is fitted by the same method as Mr. Braun used, but includes one more low year and is therefore dropped further. Mr. Braun dropped his at 19.9 cents.
Figure 11.

Actual and Normal Value of No. 2, Corn at Chicago since 1892, October-June Crop Year.
(Shift in Normals Based upon Residuals)

Source—Elmer Braun's Master's Thesis, with one year added.
ACTUAL AND NORMAL SUPPLY OF CORN IN THE UNITED STATES SINCE 1892.

Mr. Braun correlated the percent deviations from the normal of price and supply for the period 1895 to 1915. When the relationships found were applied to deviations from the new normal since 1920, he was able to predict fairly accurately the average yearly price of corn.

Figure 13 shows the relationship between supply and price. The straight line fitted to the individual observations expresses the average relationship between supply and price in terms of percent changes in price associated with given percent changes in supply. This line is approximately a demand curve expressed as a percent of normal. This may be shown in absolute numbers as is done in Figure 14, by applying these percentages to the normal price and supply for any year. The year 1927 is used in Figure 14. These normals obtained by extending the trend lines are 2,940,000,000 bushels and a price of 53.8 cents.

The demand curve shown in Figure 14 is almost a straight line. Nothing is known about the price for quantities larger or smaller than those shown on the graph.

In an attempt to apply the theory that price tends to equal the costs of production, the trend in price is plotted with the trend in supply, as shown by line CC up to 1920 and line C'C since 1920. No doubt line CC represents fairly accurately the costs of growing increasing amounts of corn* from 1895 to 1920, but it is doubtful if it represents the costs of growing different amounts of corn at any specific time especially at the present time.

If the present costs of growing corn were those indicated

* Normals as plotted include carryover. Production should be read as 100 millions of bushels less than the supply.
GROSS REGRESSION OF VALUE ON SUPPLY BY PER CENT OF NORMAL
METHOD.

by line 06 the producers could be expected to cut production to the point where this line crosses the demand curve. There has been no change in the trend in production following the change in prices. Producers say there is a surplus and this is true if they mean that new prices do not cover old costs.

In 1920 the price of corn was the lowest since 1896 and in view of that fact the farmers increased the acreage in 1921 by more than two million acres with a still lower price for corn in 1921. In 1922 there was a slight reduction in acreage from that of 1921 but in 1923, it was again increased to almost a million more than it was in 1921 or three million more than it was in 1920. From this, it would not appear that they were producing below costs, although the following explanation is often given. Each individual farmer being far in debt, increased production in hopes of getting more money. Similar action by all producers resulted in a greater surplus of corn.

A more logical explanation is that there was a real change in the costs of growing corn and that there was really a deficit of corn in relation to other crops. The farmers could make more money at growing corn than by growing any other crop and therefore, they expanded their acreage of corn. Perhaps there was a general overproduction of agricultural products or a general agricultural surplus as compared to manufactured goods but that phase of the problem is reserved for consideration in Part IV of this thesis.

It may seem queer that there could be such a great change in the cost of producing corn when the farmers' expenses have remained high or even increased in some cases. Land rent is one of
the big items of expense but the rent cost of growing corn is the alternative use value of the land and when prices of other crops fell so did the rent chargeable to corn. No doubt it became impossible to make any appreciable rate of return on land valued on previous high prices. The fall in land values meant a real loss to some who bought at high prices but only a book loss to most farmers. Practically all of the costs of growing corn are supplementary for a short period of time. The farmer has the machinery and the work stock; he performs most of the labor himself, and the seed is an insignificant item. He can not sell out temporarily, or quit for a year or two, and as long as he can make a larger income by growing corn than by growing any other crop, he continues to grow corn and this does not mean that there is a corn surplus relative to other crops. The fact that acreage was increased at this period indicates that there was rather a deficit of corn as compared to other crops.

The costs of producing corn for 1924 as shown by the data obtained from the estimates on a number of farms, in the United States Department of Agriculture Year Book for 1925, show a range in money values of all items of cost from 56 cents to $7.75 per bushel when classified on the basis of yields per acre for all states. They also show a range from 38 cents to $8.79 per bushel for the corn belt. Yields of less than eight bushels have the high costs and those of over 68 bushels have the low costs. The range in costs per acre were from $15.55 to $50.29. The highest cost per acre corresponded to the lowest cost per bushel. Land rent for the whole country approximates 1/4 of the total cost, while in the corn belt it is

* United States Department of Agriculture Year Book for 1925, page 1332.
approximately 1/3 of the total cost.

The only average costs given for the United States as a whole, are for the years 1922, 1923 and 1924.*

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of reports</th>
<th>Cost per acre</th>
<th>Yield per acre</th>
<th>Cost per bushel</th>
</tr>
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<tr>
<td>1922</td>
<td>3,363</td>
<td>23.01</td>
<td>35</td>
<td>.66</td>
</tr>
<tr>
<td>1923</td>
<td>11,238</td>
<td>23.75</td>
<td>35</td>
<td>.68</td>
</tr>
<tr>
<td>1924</td>
<td>7,153</td>
<td>23.77</td>
<td>29</td>
<td>.82</td>
</tr>
</tbody>
</table>

Apparently, these samples are not exactly representative of the country as a whole, because the yields per acre are considerably higher than the average for the country as a whole, which is 28.3, 29.2 and 22.9 bushels respectively. Nevertheless, these costs may be taken as the best data available. If these costs are deflated by the price level in those years to make them comparable to data already used, they are $ .44, $ .43 and $ .55 per bushel. They correspond closely to line C'0' in Figure 14 considering that two years are above and one below the average.

Of course many people say that average costs obtained from survey data are too low to be a measure of the price necessary to induce farmers to continue to produce the same volume. F. W. Peck in an article on "The Cost of a Bushel of Wheat"** makes the statement that, "if the average costs should determine the selling price, about half of the farmers would be producing at a loss". This may or may not be true depending on the factors included as costs, but with rent as one of the main items, the average of all costs should equal the marginal costs of production as previously explained. At any rate both methods of obtaining costs give approximately the same

* United States Department of Agriculture Year Book 1925, page 1337.
** United States Department of Agriculture Year Book 1920, page 302.
costs of producing corn at the present time. There is no way of as-
certaining the costs of growing a smaller quantity of corn. No doubt
it would be less per bushel, but just how much is immaterial in this
study. With present costs almost equal to the selling price, and that
of smaller quantities less than this, it is impossible to state the
size of a corn crop that would bring the largest net return to the
producers. Since the demand curve for corn is almost a straight line,
the supply bringing the largest net returns can be estimated as
approximately one-half of the present normal supply or 1,450,000,000
bushels. It is doubtful if the producers as monopolists, would be
interested in producing such a small quantity. This quantity surely
cannot be taken as the basis for measuring surpluses from a social
point of view.

A rectangle could be drawn in Figure 14 to represent the
largest gross returns, but this can be shown more clearly by a curve
of total values. Figure 15 shows the total value of various amounts
of corn. This curve is obtained by multiplying quantities by the
corresponding prices as shown in Figure 14. Total value could be
expressed as a percent of normal, but it is shown here in terms of
1913 dollars, on the basis that the normal price per bushel would be
53.8 cents for 1927.

If the supply were reduced about 11%, it would bring the
largest gross income to the producers. If the normal quantity were
produced, and the supply were reduced by exporting 11% more than
usual, the producers would get more from the 89% left than from the
entire crop plus whatever they received for the exports. On the basis
of this, it is not at all surprising that many corn producers favor
the McNary-Haugen type of legislation.

Figure 15 can also be made to show the effect on returns, both gross and net from variations in yields and not in acreage. The average yield of corn per acre since 1909 is approximately 26.9 bushels. The highest yield during the period was 31.5 bushels in 1920, and the lowest was 22.9 bushels in 1923. This is equivalent to a plus or minus 15% from normal. In discussing surpluses, due to variations in yields, it is proper to assume that the total costs of a normal crop equal the total value of that crop. It was explained in the first part of this section of the thesis that total costs can be represented by a straight line regardless of the proportions between fixed and variable costs when acreage is constant, and the slope of the line is of no significance. Line OC in Figure 15 is therefore drawn through the point of normal value, parallel to the base, extending from 85 to 115% normal to include extreme variations in yields. The spread between line OC and total value curve represents the relative losses or gains from large and small yields.

It is evident that the producers as a group lose more from large yield than they gain from small ones. If the producers would store from periods of abundance to years of smaller yields, the total returns to the farmers would be greater. This fact is borne out by another study made in Iowa. They found that, if corn had been carried over from years of large production and sold late, the producers would have received a profit above the costs of storage.

So far, this analysis has shown that the corn producers could gain from reducing the volume put on the market. This is only true as

applied to the returns from corn and may not add to the net income of most corn producers. Only about one corn producer out of 6 or 7 sells any corn for cash. Nearly all of the producers who sell corn for cash are located in a very fertile section in East Central Illinois and Northern Iowa.* To them low priced corn means a loss, but other corn producers do not lose directly. Many buyers of corn are also farmers and they gain from low prices. Estimates by the United States Department of Agriculture show that most of the corn is fed to livestock, about 40 percent of it to hogs, 20 percent to horses and mules, 15 percent to cattle, 4 percent to poultry and 1 percent to sheep. Farmers feeding their own corn or purchased corn, cannot gain directly from higher prices per bushel of corn, therefore any scheme for farm relief applied to raising the price of corn and not other products derived from it would not even help the majority of the corn belt farmers. The original McNary-Haugen Bill included both hogs and beef, the last left out beef. The relation between the price of hogs and the price of corn is one of the largest single items affecting the demand for corn, but it is only three times as important as that of other animal products. Any attempt to raise both the price of corn and hogs, would cause a maladjustment between the swine and cattle industry and be an injustice to the cattle raisers in so far as they are not the same identical producers.

The relation between the price of corn and that of hogs, commonly referred to as the "Corn Hog Ratio", is shown graphically in Figure 16. This represents the number of bushels of corn equivalent in value to 100 pounds (live weight) of heavy hogs. The

* Malcolm C. Cutting, "What is Surplus Corn". Country Gentleman, November 1926.
CORN-HOG RATIO:
SEPTEMBER PRICES AT CHICAGO

average is about 11.5 bushels but there has been some tendency for
this to decrease as is shown by the trend line, which falls from
12.30 to 11.17 bushels. This decrease may be due to changes in the
methods of feeding hogs. More pastures and other feeds are now used
in connection with corn, and hogs are also matured in a shorter time.

The main variations correspond closely to the cycles in
hog production. The supply and price of corn is partly a cause and
partly a result of the variations in the production of hogs. If the
hog cycle could be eliminated the price of corn would be more stable.
When the corn hog ratio is held constant in a statistical analysis,
it is found that the size of a corn crop that would yield the largest
gross returns is nearer the normal supply. When the changes in business
conditions are also held constant, the largest returns are obtained
from a normal supply. This indicates that with other conditions
normal, the farmers could gain very little by producing a smaller
quantity of corn or even by storing it from one period to the next.
The Relation of the Supply of Oats to Returns.

The oat crop is very similar to that of corn in many respects. Practically the entire amount produced is fed to animals in this country. Exports and imports average less than one percent of the total production and have very little effect on price.

This analysis of the relation of the size of the oat crop to returns is based primarily on a study made by Hugh B. Killough.*

Figure 17 shows the production and the value (deflated price) of no.2 oats at Chicago from 1881 to 1922. It also shows the straight line trends fitted to these data for the entire period. The correlation coefficient between production and value when both are expressed as ratios to their trends, is -.82. Killough also worked out the multiple correlation by the method of first differences, between actual price, production plus carry-over and an index number of the prices of farm products and obtained a multiple correlation coefficient equal to .86. When he used the supply of corn or the Canadian production of oats as a fourth variable, or an all-commodity index number in place of the index number of farm prices, he obtained a multiple correlation coefficient of the same size. This indicates that the supply of corn or Canadian oats has no effect on the price of oats in this country, or rather that this way of measuring the relationships fails to show any.

The dots in Figure 18 show the relation between the price and the production ratios. Simple correlation assumes a straight line relationship. Mr. Killough found that the curve shown in Figure 18

* United States Department of Agriculture Bulletin No. 1351, "What Makes the Price of Oats".
Figure 17 - A Comparison of the Production and the Price of Oats.
gave the best fit.* This curve may be considered as a statistical representation of the demand for oats, expressed as ratios to the trends or normal. On the assumption that a normal crop brings a normal price, a 70% crop brings a 155% price and an 80% crop a 131% price. The decrease in the quantity is more than offset by the increase in the price so that smaller crops bring the largest gross returns. It is impossible to determine the size of a crop that would bring the largest gross returns, because nothing is known about the demand for quantities less than 70 percent of normal. It is likewise impossible to determine the size of a crop that would give the largest net returns because it is either equal to or less than the quantity giving the largest gross returns, depending on the costs of production.

It is practically impossible to find out the cost of producing oats. Most of the data collected in the past has shown the costs to be higher than the selling price but the farmers have continued to grow oats. Either the method of allocating the costs is wrong, or the farmers as a group are not wise enough to grow the crops that pay. The probability is that the farmers are right, and the method of calculating the costs is wrong. Survey data showed the average costs of producing oats for the years 1922, 1923, and 1924 to be 53, 52, and 50 cents per bushel**, which was higher than the selling price.

It is very difficult to apply the theory that the trend in price equals the cost of producing oats. An analysis of Figure 17 shows that the upward trend in production ceased about 1915, and that since 1908, there has been a distinct downward trend in price.

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*The formula for this curve is \( Y = -1.9 + 1.19X \). "Best fit" means that the sum of the deviations squared is a minimum.

** United States Department of Agriculture Year Book, 1925. Page 1337.
Figure 19 shows the supply and the deflated price of oats since 1907. This period includes the war years which are usually recognized as abnormal. It also includes the depression since the war, which is perhaps still more abnormal because of the direct relationship between supply and price. In 1918 and 1919, supply and price both decreased. The increase in supply in 1920 is not large enough to account for the big drop in price. A small supply in 1921 failed to increase price but this is partly accounted for by the poor quality of oats that year. The quality of the crop as expressed in terms of a percent of a high medium grade was 18.6 poorer than the 1920 crop.* In 1922, 1923, and 1924, both supply and price increased, but price did not reach the old level. In 1925 price decreased without any corresponding increase in supply. From the above data, there can be no doubt that the trend of oat prices is downward. Little can be gained by fitting a trend to such data by any elaborate statistical method. The trends shown in Figure 19 are drawn free hand.

This downward trend in the price of oats may be due to a decrease in demand. Oats are largely used as feed for horses and the number of horses has been decreasing rapidly. Another reason for the decline in prices, may be due to the conditions under which oats are grown. The crop is mainly grown in rotations, especially with corn. It conflicts very little with other crops in the use of labor and is almost an essential part of a rotation as a nurse crop for clover. Under these conditions, the oat crop becomes essentially a by-product, whose costs of production depend on the value of the main product.

If the costs of production are taken as the trend in price for the years 1922, 1923 and 1924, they are 32, 31 and 30 cents. The corresponding costs from the survey data quoted above in terms of

* United States Department of Agriculture Year Book 1925. Page 812
1913 dollars are 36, 34 and 33 cents. The difference is not so very great; the true costs may be somewhere between the two.

Figure 20, shows a curve of the total value for various quantities of oats. This curve was constructed from the relationship shown in Figure 18 on the assumption that the normal price of oats for the year would be 30 cents (in terms of 1913 dollars). The shape of the curve would be identical regardless of the price chosen but the scale in dollars would be different.

A 70 percent crop brings the largest returns and a 125 percent crop the smallest returns. Any increase in supply due to increased acreage, tends to bring smaller returns. This was also true of corn. Both crops are largely raised on the same area. If the farmers tried to increase the returns from either crop by growing less of it, and more of the other, the chances are that they would not increase the total returns from both crops. If they produced less of both crops, they might gain at the expense of the rest of society.

The effect of large yields on total gross and net returns can be illustrated by Figure 20 in the same manner as was used for corn.

The arithmetic average yield since 1900 is 31.7 bushels per acre; this is almost one bushel more than the most common (modal) yield. The extreme variations for this period are 23.7 bushels in 1921 or 25.2% below the average, and 37.8 bushels in 1915 or 19.2% above the average. Line CC, representing costs, is drawn to include this range.

It appears from the diagram, that gains on the short crops tend to offset the losses from large crops, and no doubt this is true.
Figure 20.
Total Value of Various Supplies of Oats.
There is no more reason for calling large yields surpluses, to be treated in some special manner, than having special treatment for low yields as deficits. Farming cannot be operated as a one-year business.

The question of whether or not, it would pay to store from one year to the next, can be illustrated better by the table from which Figure 20 was constructed.

<table>
<thead>
<tr>
<th>% Normal Supply</th>
<th>Probable Value per Bushel</th>
<th>Supply in Bushels (000,000)</th>
<th>Total Value in 1913 dollars (0,000)</th>
<th>Gains in dollars (0,000)</th>
<th>Losses in dollars (0,000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>70</td>
<td>.465</td>
<td>980</td>
<td>45576</td>
<td>3570</td>
<td></td>
</tr>
<tr>
<td>75</td>
<td>.429</td>
<td>1050</td>
<td>44745</td>
<td>2745</td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>.393</td>
<td>1120</td>
<td>43197</td>
<td>2016</td>
<td></td>
</tr>
<tr>
<td>85</td>
<td>.365</td>
<td>1190</td>
<td>42714</td>
<td>1197</td>
<td></td>
</tr>
<tr>
<td>90</td>
<td>.339</td>
<td>1260</td>
<td>42294</td>
<td>714</td>
<td></td>
</tr>
<tr>
<td>95</td>
<td>.318</td>
<td>1330</td>
<td>41400</td>
<td>294</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>.300</td>
<td>1400</td>
<td>40400</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>105</td>
<td>.282</td>
<td>1470</td>
<td>41250</td>
<td>550</td>
<td></td>
</tr>
<tr>
<td>110</td>
<td>.267</td>
<td>1540</td>
<td>41116</td>
<td>862</td>
<td></td>
</tr>
<tr>
<td>115</td>
<td>.253</td>
<td>1610</td>
<td>40738</td>
<td>1270</td>
<td></td>
</tr>
<tr>
<td>120</td>
<td>.240</td>
<td>1680</td>
<td>40320</td>
<td>1680</td>
<td></td>
</tr>
<tr>
<td>125</td>
<td>.228</td>
<td>1750</td>
<td>39900</td>
<td>2100</td>
<td></td>
</tr>
<tr>
<td>130</td>
<td>.222</td>
<td>1820</td>
<td>39404</td>
<td>1596</td>
<td></td>
</tr>
</tbody>
</table>

The losses on crops up to 15 percent above normal, are not offset by gains on crops the same percent below normal. The losses from very large yields are more than offset by the gains from very small yields. Since variations in yields cannot be predicted in advance, it is rather doubtful if total returns can be increased by storing. If part of a crop a little above normal, were carried over and added to a crop a little below normal, the total value of both
crops would be reduced. The same is true if part of a crop above
normal were to be carried over and added to a normal crop.

This does not mean that individual farmers or speculators
could not make money by carrying over part of the supply from large
crops, but tends to show what would happen if all did the same thing
or if some large cooperative society tried to do it.

Data regarding carry-over, show that there is practically
the same quantity carried over from one year to the next regardless
of variations in production. The main exception was the large carry-
over following the bumper crop of 1915.

As long as the variations are less than 15 percent in supply
total returns could be increased by storing. Variations within this
range are most common, but the question of increasing returns by
storing becomes very speculative. Perhaps even too much so, for the
professional risk takers, since there has been little variation in
storage in the past.

Mr. Killough found that the four short crops of 1901, 1903,
1907 and 1909 had been worth $69,000,000 more than the four large
crops of 1902, 1904, 1905 and 1906. He also found that if the con-
sumption of oats had been uniform, part of the large yields carried
over, the total value of the oat crops from 1895 to 1913 would have
been $171,000,000 or nine cents per bushel greater. His analysis was
based on the most probable December 1st farm price, and it made no
allowance for cost of storage or differences in quality. This would
indicate that it might pay to store from large to small yields.

The drop in oat prices in 1920 was practically equivalent
to the drop in corn prices, and has the same relation to the recent
agricultural depression. The acreage of oats was increased in 1921 but the yields were poor. In 1922 and 1923, the acreage was reduced to its former level. It is doubtful if the farmers could have increased their returns by substituting corn for oats, or vice versa. Changes in acreage do not indicate that there is a surplus of oats relative to other crops. Farmers could obtain larger returns from the oat crops if they could limit production, but quantities larger than those that would give the largest returns to the producer, cannot be considered as a surplus from a social point of view. Neither can large yields be considered as surpluses detrimental to the farmers, because the losses on these crops tend to be offset by the gains from the small crops.
The Relation of the Supply of Potatoes to Returns.

The potato crop ranks sixth in the United States on basis of acreage and value but considered as a table food, it is second only to wheat. About 70 percent of the total crop in the United States is used as table food; the remaining 30 percent is divided as follows:

- Culls and unsaleable stock: 10%
- Diseased and frozen stock: 5%
- Storage shrinkage: 5%
- Seed for following crop: 10%

Since exports and imports are of little importance, potatoes are not considered in the surplus discussions which deal with exportable surplus, but it is very often referred to as an example of a crop where large yields depress the price to such a point that it often does not pay the farmers to harvest the crop.

The potato crop of the United States is really divided into two quite distinct crops. The early crop is produced mainly in the southern states, while the major portion of the crop comes primarily in what is often called the late crop states. In speaking of the potato surplus, it is practically always in reference to the late crop. This analysis of the relation of the size of the crop to returns is based upon a study of factors affecting Minnesota potato prices by Dr. Holbrook Working.

Figure 21 shows the average price of potatoes in the Twin Cities as given by Mr. Working, the weighted average farm prices and December 1st farm price as given in the United States Department of Agriculture Year Books. All three of the prices show the same

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* United States Department of Agriculture Year Book 1925, page 347.
** Minnesota Experiment Station Technical Bulletin, numbers 10 and 29.
Figure 21.

Production and Price of Potatoes.
general fluctuations, but the spread between the wholesale and the farm prices is much greater in periods of high prices than in periods of low prices. It is quite evident from this, that the relation of the size of the crop to the total value as indicated by wholesale prices does not correctly represent the total returns to producers, but that in general, it indicates the relative returns from large and small crops.

Figure 22 shows the deflated wholesale price of potatoes and the trend in value per bushel. Figure 23 shows the supply and trend in production of potatoes since 1902.

Apparently the prices of potatoes did not drop comparably to the prices of corn and oats as already shown for those crops in 1920. That is, the deviations from the normal price are apparently due mainly to changes in production, so that one trend line represents the whole period fairly accurately, while for corn and oats, the drop in price was much greater than that explicable by changes in volume. This condition apparently made potato culture relatively more profitable than the raising of other crops, and may account for the large increase in acreage especially in 1922 when it was approximately 10% over the previous year.* It would appear as if the price conditions caused a temporary deficit of potatoes, relative to other crops and that farmers reacted to this by greatly increasing the acreage, and as this was couple with favorable yields, the resulting price was very low. Three years of high production and low prices or what may be called a relative surplus of potatoes, caused the farmers to react in just the opposite manner. They cut acreage about one-third, 

* See Figure 21.
Figure 22- Trend in Potato Prices.

Figure 23- Production of Potatoes in 27 Late Crop States.

Source- Univ. of Minn. Ag. Ex. Station Tech. Bul. 29, page 3.
(Last two years are added)

Source- Univ. of Minn. Ag. Ex. Station Tech. Bul. 29, page 11.
from its high point. This resulted in short crops and high prices for the last two years. Apparently one year of high or low prices has little effect on acreage, but two or more consecutive years of high or low prices, causes considerable reaction on the part of farmers. This is also borne out by the drop in acreage in 1916 following a period of low prices.

The fact that the reactions of farmers to the changes in the prices of potatoes as indicated by the number of acres planted is greater than that for corn or oats, may be due largely to the relative amount of cash, or its equivalent required in growing potatoes. It requires about 12 bushels of seed per acre, which can be considered as a direct cost in most cases, and the cash outlay for poison is much more than the seed costs for corn or oats. It was explained in the case of corn that for a short period, practically all costs are supplementary, but this is not as true in case of potatoes.

This change in acreage of potatoes is not conclusive proof that higher prices cause an expansion of production, but it surely is a strong indication of that tendency and it puts the burden of proof on those who hold the opposite point of view. Many of the advocates of special legislation to increase prices of particular crops, assert that production will not be increased.

Figure 24 represents the demand curve * for potatoes as constructed by Dr. Working. Corrections have been made in this case

* This figure is taken from an article by Dr. Working on "S statistical Determination of Demand Curves", Quarterly Journal of Economics, August 1925. It is very similar to those found in The Minnesota Technical Bulletins, no. 10 and 29.
Figure 24.

Demand Curve for Potatoes.

Figure 25.
Total Value of Various Supplies of Potatoes.
yields. The average yield since 1902 is 106.4 with a high yield of
134.8 in 1924 or 26.7% above average, and a low yield of 76.5 in 1916
or 26.2% below average. The total cost line is drawn to include this
range. Since 1921, the yield has been above the average which may
indicate that trend in yields is upward and therefore a smaller acre-
age will be required in the future to produce a normal supply.

From Figure 25, it is apparent that gains on short crops
much more than offset losses on large ones. This would indicate that
the farmers in the potato producing regions who plant the same acre-
age every year would make money raising potatoes and since yields
cannot be controlled and farming made a one year business, surpluses
of potatoes due to large yields cannot be considered as a problem to
be regulated by any form of group action. The same Figure tends to
show that farmers planting more acres of potatoes following high prices,
tend to lose because large crops bring much less. No doubt the large
 gains from small crops is the main factor causing wide variations in
the acreage planted.

Apparently there has been a real change taking place in the
demand for potatoes so that Figures 24 and 25 do not properly represent
conditions at present. As evidenced from Figure 26 published in the
Minnesota Potato Market Letter of December 1926, the demand for potatoes
is becoming more inelastic in the period from 1917 to 1925, than in the
period from 1902 to 1909. 1917 and 1917-1925. Of course eight
year periods are too short to show conclusively that a change has
taken place, but nevertheless they are strong indicators of that fact.
The curve for the last eight years is much steeper and straighter
indicating that a small production brings a much higher price than
Figure 26—Relationship between Potato Production in 27 Late-Crop States Divided by Population in the United States and Wholesale Price in the Twin Cities corrected for Price Levels.
formerly and that a large production brings a somewhat smaller price. If the total value curve in Figure 25 had been constructed from this demand curve, it would show much larger gains from small crops and greater losses from large crops. A smaller diagram appeared in the 1926 October number of the Monthly Supplement of Crops and Markets, and the same thing is borne out. If a demand curve is drawn for the period 1860 to 1900, it is much flatter and more nearly parallel to the base line, than one drawn for the period since 1900. These curves indicate that the eating habits of the people as far as potatoes are concerned are becoming relatively fixed; they tend to consume the same amount of potatoes regardless of the price. There may be many reasons for this change but they are not important here; it is rather the relation of this change to the question of surpluses that is of importance.

It becomes far more desirable from a social point of view that the farmers plant the right number of acres and that yields be controlled as far as possible. Increasing the acreage beyond the amount necessary because prices have been high for a year or two, will amount to practically wasting that much productive effort for a year. Likewise cutting acreage unduly will result in a social loss because the returns to society would have been greater using that acreage for potatoes than for any other crop. Whether larger losses and gains will tend to stabilize acreage, or cause wider fluctuations, is hard to say but if it causes wider fluctuations, it will surely be of interest to society to try some measures to control acreage.

The fact that the gains from small crops more than offset
the losses from large crops in the case of potatoes, but only tend to equal them in the case of oats and corn, may be due mainly to the element of storage. Storage of potatoes is practically impossible. Some storage of corn and oats always takes place and the effect of this on past prices is included in the statistical demand curves.
The Relation of the Supply of Cotton to Returns.

The cotton crop in the United States is similar to the crops already discussed in that the price is highly correlated with production in this country, but in this case, it is the world price rather than the domestic price. H. L. Moore* found a correlation coefficient of -.319 by using percentage change from the preceding year. B. B. Smith** obtained a multiple correlation coefficient of 0.955 by using logarithms of "the average spot price in cents per pound at New Orleans during December"—the December all-commodity index of the Bureau of Labor Statistics and supply as carryover plus production in millions of bales.

The reason for this relationship between production in the United States and price is quite evident when one recognizes the importance of United States production in the total world supply. Figure 27 shows the estimated world commercial crop production in the United States, and exports from the United States. The United States produce on the average over half of the world's supply, and exports on the average over half of its total production.

The production in the United States is the dominant factor in the world supply. During the period shown only three times, 1910, 1919, and 1920, did the world supply vary inversely to production in the United States and during the rest of the period the changes in world supply were almost equivalent to the change here.

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** Smith, B. B., "The Adjustment of Agricultural Production to Demand", Journal of Farm Economics, April 1926.
The analysis given here of the relation of the size of the crop to the total returns, is based primarily on the study made by E. B. Smith. Figure 28 copied from The Journal of Farm Economics of April 1926*, shows graphically the relation of supply of cotton to price, and total returns. The curve labeled, cotton price-supply curve, is equivalent to a statistical demand curve for cotton. It shows the average effect on price of supplies ranging from 11 to 18 million bales. The effect of smaller or larger supplies than this cannot be determined statistically. The lower curve shows the gross returns from various sized crops. The smaller the crop, the larger the returns from it, and since one does not know anything about the demand for very small quantities, it is impossible to state what sized crop would bring the largest gross return. Likewise, it is impossible to tell what sized crop would bring the largest net returns because that would be a still smaller quantity.

The effect of variations in yields on total returns could be illustrated the same way as in the case of the other crops, by assuming that the total costs equal the total value of a normal crop. Since the line representing the total value is almost straight, it makes very little difference what supply is taken as normal. Drawing a line to represent the total cost through value at such a point and parallel to the base would show that losses from large yields are approximately offset by gains from low yields. Mr. Smith makes the statement that "in times of large crops, costs per unit of picking are sometimes double those in times of small crops, owing to the competition for pickers among producers". Since picking costs are a

* Journal of Farm Economics, April 1926. Page 152.
Figure 26.

Cotton Price-Supply Curve.

\[
\text{Price} = 0.689 \times \text{Price Level} - 1.548 \times \text{Supply} + 1.705
\]

Cotton Value-Supply Curve.

Source: Journal of Farm Economics, April 1926, p. 158
very important item of total costs, it would appear as if the total cost line would have to be represented by a curved line, rising at an increasing rate for larger yields. This would tend to increase losses on large crops, but since total returns from crops rise more rapidly for small crops than it falls for large ones, it is safe to say that the gains on small crops compensate for the losses on the large ones.

An analysis of Figure 28 will also tend to show that any system of storage of cotton from large crops over to periods of short crops, will reduce total returns, rather than increase them, even if such a procedure might be desirable for other reasons. Take two crops for example, one of 17 million and one of 13 million bales, they will bring a little more in total returns if sold when produced, then if 2 million bales were stored to make the supply equal both years. If costs of storage and the risk of two large crops following one another are considered, the producers as a group would lose considerably by storing large crops.

The biggest single factor affecting both acreage and yield of cotton for several years, has been the boll weevil. It is the main cause for the few very short crops which brought the cotton farmers as a group, more money while at the same time, it ruined many individual farmers. No doubt the boll weevil is largely responsible for the present large crop, because it did not cause as much damage last year as in previous years.

The yield per acre of cotton is to some extent controllable by the amount of fertilizer used. Mr. Lawrence Meyers in making a study of the fertilizer consumption* in the United States found that

* Unpublished work now in process of completion at University of Minnesota.
price of cotton was the biggest factor in determining fertilizer consumption in the United States the following year. The coefficient of determination was 66 for eight southern states. Mr. O. P. Blackwell, professor of Agronomy, Clenson College, South Carolina, found a correlation of .673 between amount of fertilizer applied and the increase in the yield of cotton. Mr. E. E. Vial in making a study of fertilizer consumption in the United States found a correlation of .695 between fertilizer tonnage and value of cotton per acre.

All of these studies show that with higher prices for cotton, the producers try to farm more intensively and that the application of fertilizer definitely influences the yield.

No doubt the easiest controllable factor in determining total production of cotton is acreage and to a large extent, it is responsible for changes in total production which may be called either surpluses or deficits, depending on what one considers normal, or the desired amount. Figure 29 represents graphically the relative changes in acreage associated with relative changes in price. This graph is taken from the Article by B. B. Smith, and it shows that the producers are constantly attempting to adjust the acreage to the price of cotton, but that they are always over-adjusting, so that, they increase both the deficits and the surpluses. The correlation in this case is +.94 between change over the preceding year of the average price in cotton in New York, during January deflated by the Bureau of Labor Statistics index number of farm products and the change in acreage over the preceding year.

* Better Crops, January 1924.
** Farm Economics Series, Cornell University, December 1926.
Figure 29.
MILLIONS OF ACRES INCREASE OR DECREASE

Source: Journal of Farm Economics, Apr. 1926, p. 147.

Change in January Relative Price of Cotton in U.S. Average over Previous Month.
From this graph, one may conclude that on the average cotton prices cover costs of production, but the losses and gains alternated practically every year, except during the last three years shown on the graph. A relative gain one year causes over-expansion the next year and prices fall so low that they do not cover costs. A graph of this kind although not conclusive proof, shows that any scheme of artificially raising price without artificially restricting acreage, will lead to increased production.

In concluding this section on cotton, it may be said, that there is always a surplus of cotton from a monopoly price point of view, which is not a surplus at all from a social point of view; that every other year or the year following a high price of cotton, there tends to be a surplus of cotton relative to other crops, and that in so far as large yields per acre reduce price below costs of production, low yields raise price above costs, so that on the average, costs are covered and any scheme to artificially dispose of large yields at higher prices would tend to still further stimulate production.
The Relation of the Supply of Wheat to Returns.

The relation of wheat production in the United States to the price per bushel and the gross returns from the crop is quite different from that of the crops already discussed. Wheat is one of the most important agricultural commodities with a world market. It is different from cotton, rubber and coffee in the fact that production is carried on in nearly all countries and no single country or area dominates the market. It is commonly recognized that the price of wheat is determined by world production and world demand and that the price is best represented by the price at Liverpool. Prices in other parts of the world tend to correspond closely to the Liverpool price plus or minus the freight costs, depending on whether or not the country is on an import or an export basis. The correlation between the Chicago price and the price in Liverpool for the period from 1890 to 1921 is +.93.*

Although the United States is by far the largest single producer of wheat, it produces on the average only about one-fifth of the total world supply. This makes the relation of the United States production to the price very small, or stated as a correlation coefficient, the ratio of the United States production to Chicago price, is only -.32, while the relation of the crop of the entire world to Chicago price is -.72, and the relation of world production plus carry-over to price is -.80. When the price of wheat is correlated with world production of wheat plus carry-over, and world production of rye, the multiple correlation coefficient is .86. **

Although these coefficients tend to show the relationship that exists between price and quantity, they are of no value in estimating the change in price corresponding to a change in quantity. One must know the value of the b's or the estimating equations. In the Journal of the American Statistical Association for June 1926, C. C. Bosland gives the equation for estimating the price from the supply on a basis of deviations from the normal as \( \text{Price} = 0.01648 + 1.4964x_{\text{supply}}. \) This is based on a correlation of \(-0.74\) for the period 1896 to 1915.

This relationship is not great enough to show accurately the relation between quantity and price or total value, but it is close enough to indicate fairly accurately the general aspects of the problem. Mr. Bosland had to fit a new normal for supply since 1915, similar to the new normal fitted to the price of corn since 1920 by Mr. Braun. He found that, from the relationship between the deviations from the trends for supply and price determined previous to 1915, he could apply them to the period since, and for cost price more accurately than for the period used in determining the relationship.

There may be some question of just what constitutes normal price and normal supply at the present, but since we are interested in the relationships rather than the actual amounts, we can make the analysis on the basis of deviations from the normal without calculating the normal.

Figure 30 shows the relation between the world supply and the price per bushel and the total world value. The line representing the price per bushel with various changes in the world supply is calculated from the above formula. It is a form of a statistical demand curve, but it can only be said to approximate the true demand.
Relation of Supply of Wheat to Price and Total Value.

Figure 30.

- Price per Bushel
- Gross Value in World
- Gross Value in United States

Percent Normal Price and Value vs. Percent Normal Supply.
curve for wheat, if there can be any statistical demand curve determined since the whole world is included and all local tariffs, wars, depressions, as well as all world wide disturbances, affect the demand for wheat. Everything considered, it is more surprising that the relation between supply and price equals an $r$ of \(-0.74\) than that it is not greater.

The curve representing the total world value ($\text{Price} \times \text{Quantity}$) is also expressed on a basis of percent of normal. Supplies of approximately 15% below normal, would tend to give the largest gross returns to all producers, but not much more than a normal quantity. On the other hand, any increase above normal in world supply tends to reduce gross returns considerably. If a concept of total world costs equal to normal value is possible, it becomes evident that producers of wheat as a group, lose more by large crops than they gain by small ones. The world market for wheat is highly competitive between various countries, so that individual ones suffer losses from large production in other countries and not by increased yields in their own land.

This can be illustrated by applying it to the United States. Normal production for the United States is approximately one-fifth of the total world supply. A ten percent increase or decrease in United States production is equivalent to a two percent change in the world supply, a twenty percent change in the United States to a four percent change in world production, etc. Let the base scale in Figure 30 represent the percent of normal production in the United States, then multiply these quantities by the corresponding world price, and the result will be line US which represents the gross returns to the United States wheat farmers. The larger the crop, the greater are the
gross returns to the farmer. If the world production was large when
the United States production was meager, the returns would be much less
for the small crops. While if the United States production was large
while the world production was small, the gains from the large crops
would be much greater. The producers in the United States have been
fortunate in the past because the latter situation occurred more fre-
quently.

Popular opinion seems to be that the wheat farmers in the
United States lose by larger yields in this country. This is not so,
as Figure 30 indicates. An analysis of past data shows that the farm-
ers have received more for their wheat than they could reasonably have
expected. A measure of the amount actually received can be obtained
by multiplying the actual production by the deflated price for each
year. The amount that the farmers expected can be obtained by using
a ten year moving average of yields, multiplied by the trend in acreage,
to give the expected production, and this multiplied by a ten year
moving average of deflated prices to give expected returns.

When the actual returns during the period 1866 to 1925 are
compared to the expected returns, it is found that the farmers received
about 250 million 1913 dollars more than they expected. This is equal
to one-third of the value of the 1925 wheat crop and more than the
total value of the wheat crop in 1866 or 1870. If the analysis is made
to include only the period up to 1919, the gains are much larger than
this.

This can also be shown by plotting the total production
and the total returns as is done in Figure 31. There appears to be
almost a direct correlation between production and total returns.
Figure 37. Production and Total Value of Meat in the U.S. (in Hundreds of Millions)
Large crops have brought more than small crops with the exception of the years 1898, 1896, 1906, 1913 and 1921. The difference in those years is very small in favor of the small crop. During the other 35 years, the large crops have brought more than the small crops, and not only more in proportion to size, but the farmers were fortunate in getting large crops when world production was as short as in 1891, 1898, 1909, 1915 and 1919. A study of this chart indicates that the idea of an export bounty to help farmers when the wheat crop is large, is not helping them when they need it. In years such as 1890, 1893, 1900, 1904, 1907, 1911, 1916 and 1921 when the United States crop was small and the world crop relatively large, the farmers really needed help if they ever did. Proposed remedies for farm relief would not function in such cases of relative scarcity. The wheat farmers have received more for their wheat than they could reasonably have expected, and therefore are not entitled to any special consideration not given to all farmers.

So far nothing has been said about the costs of growing wheat. The average deflated price of wheat has been approximately $1.00 a bushel since 1866. Historically wheat has been produced at constant cost. The 1925 Year Book* gives the average costs per bushel for the year 1922, 1923, and 1924 as $1.23, $1.24 and $1.25 respectively which is higher than the prices received. Such figures are very apt to be too high and although valuable for making comparison between costs on different farms or between different years, they are misleading and only add to discontent when compared to prices, especially during years when price is below normal.

* United States Department of Agriculture Year Book, 1925, page 1337.
An analysis similar to that made for the other crops, can be made by drawing line OC in Figure 30 to represent the total costs to producers in the United States with acreage constant. It is apparent, that the producers always tend to gain on large crops and lose on small ones. The losses and gains tend to balance each other. We may make another assumption that costs per unit are constant as volume is increased by increasing acreage. This is not strictly correct, because when the acreage of wheat is increased, poorer land or land of a higher alternative use value has to be planted. In decreasing acreage, the poorest land is left out first, or wheat land has to be turned to some less valuable use, but the above assumption will hold for the purpose of illustration. If costs per unit were constant, then a 10% reduction in acreage, would give a 10% reduction in total costs etc. Total costs on this basis can be represented by the line O'C' in Figure 30. This shows that increased acreage tends to be followed by a loss, while decreased acreage by a net gain above costs. On the basis, that a straight line represents total costs due to changes in acreage, the smaller the acreage the larger the net returns, and the greater the acreage, the larger the gross returns. If there were any possible way of determining the exact costs of growing a smaller volume so that line O'C' could be represented as a curved line, which is more logical than a straight line, it is altogether probable that the largest net returns would come from about 55 percent of the normal acreage.

To conclude this section on wheat, it is safe to say that increased yields of wheat per acre in the United States, cannot be considered as surpluses which depress the price and reduce total returns. It is also safe to say that increased production due to in
increased acreage does not reduce total returns, but may bring returns less than costs of production— a condition to be remedied by cutting down acreage rather than by some form of special legislation. No doubt too many acres of wheat were planted between 1919 and 1924, but by 1925 acreage had decreased to the pre-war level. In so far as this acreage had alternative use, there was a surplus relative to other crops, but in so far as this acreage was semi-arid land of no alternative use, it should never have been brought into use.
Conclusions Regarding the Relation of Supply to Returns.

The relation between supply and returns is practically the same, if production is almost a continuous flow as when the total supply for a year is harvested or produced during one season. For such commodities as pork, beef, and eggs which are produced and marketed at all seasons, it is very difficult to measure statistically the relationship between quantity and price. Data regarding the above commodities are available in sufficient detail to show approximately the same analysis as was made for corn, oats, potatoes, cotton and wheat.

Figure 32 shows the relation between supply and returns from hogs.* The price per unit, represented by the curve DD, decreases as quantity increases, but not fast enough to offset the increased supply, so that as far as can be foretold the greater the number of hogs, the larger the gross returns. This is indicated by the line VV. On the assumption that the cost per unit of producing hogs is constant, line CC can be drawn to show total costs. On this basis it becomes impossible to tell how small a supply would give the largest net returns. No doubt costs per unit increase rather than remain constant as supply is increased so that the gains would be larger on quantities less than normal and the losses greater on supplies above normal. The fact that both hog production and prices tend to follow a definite cycle of approximately three years, is in itself proof that the above diagram nearly represents the relation of losses and gains from hog production. Few hogs and high prices stimulate production. It requires about a

* Based on the data in, Factors Affecting the Price of Hogs. United States Department of Agriculture Bulletin, no. 1440.
Demand and Total Value of Hogs.

Figure 32.

Source: Haas and Ezekiel, Factors Affecting Price of Hogs.

Demand and Total Value of Beef.

Figure 33.

year and a half before the increased supply reaches the market. The result is lower prices and a relative loss to the producers, who in turn cut down production. The farmers as a group respond too much to both high and low prices. This over-response on the part of the producers is the chief cause for production cycles, the frequency of which depends primarily on the length of the production period. For cotton as previously shown, cycles occur every other year, for hogs every three years, and for horses or fruit trees every seven to nine years.

To artificially keep prices up when production is great may prevent the usual reduction in supply, and thereby help to eliminate the cycle, but unless it keeps the price up by just the right amount, it may increase production still further with the ultimate effect that the cycle is increased rather than decreased. If prices were artificially raised for all variations in supply, the result would be that the same kind of a cycle as at present would persist, but the average production would be higher or a new normal would be brought about whose permanency depended on the maintenance of the artificial stimulus. The ultimate removal of such a stimulus would be fought on the basis of vested rights, and if removed would cause losses equal to any gains when first applied. Whether or not there would be any gains during the period of operation of such an artificial stimulus is a debatable question. It depends largely on the relative change that would take place in the costs of production and the relative profitableness of other farming enterprises.

Figure 33 shows the relation between the supply and returns
from beef. The demand curve for beef is flatter than the one for hogs and therefore the total gross value for beef rises more rapidly. The larger the supply, the greater the gross returns are. Line CC representing costs is drawn on the assumption that costs per unit are constant. On this basis, smaller supplies bring larger net returns. The relative losses and gains for supplies above or below normal are not as great as those for hogs, but in each case the losses and gains tend to offset each other.

Figure 3** shows the relation between the volume of eggs, price per dozen and the total returns. Curve DD represents the price per dozen as received, while curve D'D' represents the price per dozen that would have been received if the dealers had not put eggs into storage with present storage conditions. Larger supplies of eggs bring larger total gross receipts, while if there were no storage of eggs, very large receipts of eggs would decrease the total gross returns. As a result of storage, the producers lose about 6 cents a dozen on 500,000 cases, and gain about 5 cents a dozen on 2,220,000 cases. Storage facilities tend to prevent large seasonal supplies from greatly lowering price, or becoming what many people call seasonal surpluses.

One illustration may be given to show that the relationships between supply and returns already discussed, apply equally well to seasonal crops shipped into a single city market.

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* Based on "The Statistical Measure of the Elasticity of Demand for Beef," Journal of Farm Economics, July 1924.
** Based on a Paper, "Kinds of Agricultural Surpluses" read by Mordecai Ezekiel at the December 1926 meeting of The American Association for the Advancement of Science.
Figure 34.
Demand and Value for Eggs.

Source: Kinds of Agricultural Supplies, by Ezekiel.

Figure 35.
Returns from Peaches sent to N.Y. City.

Source: Same as for Figure 34.
Figure 35 shows the relation between carloads of peaches from Georgia arriving in New York City per day in 1924, and the price and returns.*

The analysis is carried a little further in separating gross returns to farmers. The price per crate shows that the demand for peaches on a daily basis is fairly elastic so that the larger the supply, the greater the total returns. But more than 100 cars per day increases the gross returns very little. Freight from Georgia, where most of the crop is grown, was 71 cents per crate and the commission was 7% of the selling price. By subtracting these costs from the selling price to get net returns per crate to the producers, and multiplying by the supply, it is found that about 80 carloads per day brought the largest returns to the producers. This is really not net returns as the term has been used previously, but rather gross returns to the producers. From this would have to be subtracted the costs of production and of harvesting before the largest net returns could be determined. Chances are that, this would be for a much smaller quantity.

In discussing this situation, Mr. Ezekiel makes the following statement: "Under such conditions it would obviously pay to ship only 80 cars per day to New York and dispose of the remainder at any other market where they would add anything at all to the total returns, or even let them rot on the trees. Consumers could hardly feel that farmers were acting unjustly in letting fruit go to waste, when the fruit could be disposed of only by the farmers paying for the privilege of

* Based on a Paper, "Kinds of Agricultural Surpluses", read by Mordecai Ezekiel at the December 1926 meeting of the American Association for Advancement of Science.
giving it away". Such a statement sounds very reasonable if one does not examine it carefully. How absurd it becomes from a social point of view! Just return briefly to cotton and potatoes where the smallest supply of which we know anything about brings the largest gross returns. A similar statement for those crops would read, the farmers would be perfectly justified in not harvesting most of the cotton or in letting most of the potatoes rot in the ground. Again as applied to peaches, from the consumers' point of view, the statement would read: We are perfectly justified in going without peaches rather than to pay a higher price when the crop is short. If the farmer will not let us have cheap peaches when the supply is plentiful, we will not pay high prices for it, when the crop is small.

Mr. E. Zekiel also makes the following statements which seem to lack good economic reasoning. "The more fundamental cure, however, is to prevent the occurrence of such a situation. Where short-period surpluses are due solely to unusual weather conditions as peaches during 1924, this would not help; (this refers to some system of pooling) but where overlapping between competing regions make such surpluses occur, regularly, that is a case of true overproduction which cannot be corrected by marketing measures alone." Exception must be made to the last part of this statement. If competing regions regularly produce so much, that it brings smaller returns to the producers than a smaller quantity would bring, it is not a case of overproduction at all but only indicates that our competitive system of economics tends to function for the best interest of society. If farmers regularly produce such a quantity, they must be receiving in return enough to cover costs and that is all they are entitled to.
In the first part of this section of the thesis, it was pointed out that under conditions of free competition, production tends to be carried to the point where costs and value are equal, and only in case of some form of monopoly will value regularly be above the costs. Since total value curves have been obtained which increase, decrease or do both as quantity is increased or decreased from the competitive normal, it may be necessary to return to Figure 1 to show that the same principles apply in all cases. The apparent differences are due to the relation of costs to demand.* In Figure 1, it was pointed out that under competitive conditions quantity OG would tend to be produced. The costs of producing this quantity are just equal to its value. If the only quantities for which statistical data are obtainable are greater than OG, which is the quantity that would give the largest gross returns, then the smallest quantity of which there is any record yields the largest gross returns as in the case of cotton, oats, and potatoes. If the cost line CC were higher the same relation would exist, but the curve of total value would be different. For instance, if the costs were equal to OP (the price of the quantity giving the largest gross returns) then the normal

* This relationship may also be explained in terms of the elasticity of demand. If the demand for the product is elastic then the total value will increase as the quantity increases. While if the demand is inelastic, the total value will decrease as the quantity increases. A straight line demand curve on ordinary graph paper as drawn in Figure 1, represents demand as being elastic for small quantities and more inelastic for large quantities. For some commodities such as cotton, oats, and potatoes, the known part of the demand curve is inelastic so that the total value curves decrease as the quantity increases, while for hogs and beef the known part of the demand curve is elastic so that the total value increases as the quantity increases.
quantity produced under competitive conditions, would yield the largest gross returns. If the costs were still higher, say 0\$ \text{per} \text{lb}, the normal supply would yield small returns and larger quantities larger returns up to the quantity 0\$. Since only a small range in quantity is known and this entire range may be less than the quantity 0\$, the total value curve increases as the quantity increases as in the case of the curves drawn for hogs and beef, also eggs and peaches. The last two curves practically extend far enough to include or just reach the quantity giving the largest returns. When wheat is considered from the world point of view, the range in quantities about which value is known, includes the quantity giving the largest gross returns but extends mainly to the larger quantities giving smaller returns. Wheat considered only from the standpoint of production in the United States shows that where increases in part of the total supply is considered from the standpoint of gross returns for that part of the total supply, the greater the increase, the larger the returns. On this basis, it becomes absurd to speak of a surplus of wheat in the United States as a quantity so large that it reduces the total returns to farmers of the United States. But the concept would still hold, if applied to the whole world. The world crop can and usually is so large, that it reduces total returns to all producers of wheat. The United States production or world production of wheat, may easily be so large that the total returns from wheat to United States producers is less than the total costs. Since the value of wheat depends mainly on the costs of production in other regions of the world, and the costs of production in the United States mainly on the relative profitableness of producing other commodities in this
country, and since the losses and gains due to variations in yields per acre tend to balance, one can not determine from the available data that a surplus exists in any one year or period of a few years.

If this type of analysis were extended to include more crops or smaller markets, no doubt the results would be very similar. In the case of corn, oats and potatoes, production and market areas included the whole United States. Potato production in Minnesota or corn production in Iowa has the same relation to the United States market for these products as wheat production in this country has to the world as a market.

If the market is limited to one city or section and production to the surrounding territory as in case of many fresh vegetables or such bulky commodities as hay, the returns to the producers in that territory have the same relation to their production as total corn production to the United States market or total wheat production to the world market. Large supplies reducing the returns to the producers of such commodities are often spoken of as local market surpluses. Fundamentally they are of the same nature as a general surplus of corn or potatoes. The usual remedy for such conditions is to extend the market to include a wider territory, and in so far as this is brought about, by increased transportation and storage facilities, these local surpluses cease to be considered as such.

Cotton serves as an example of a condition in which one country or section produces the entire supply of the major portion of it for the world market. Other examples of such products are coffee in Brazil and sisal in Yucatan. Raisins in California are similar in respect to the United States as a market. If production of such
products is carried too far, the situation cannot be remedied by extending the market but only by some effective control of production. Where the producers are concentrated in a small area, combinations are more easily formed and they may limit production so as to prevent cycles or even obtain some monopoly returns.

Wheat serves as an example of a crop with a world market and in which the United States production is only a fraction of the world supply. The same conditions would be true of rye, barley and rice. In such cases, the market cannot be extended and the concept of a surplus as a quantity that reduces total returns cannot be applied to any one country or section. In this case, any one region cannot produce enough to reduce the total returns so any concept of a surplus in such cases, must be relative to the costs or the profitableness of some other crop. If in such cases, one crop brings less than some other product, the remedy is to shift to the other product. In case that no other product pays as well as the one under consideration, there is no surplus unless the land should be left idle. This will be discussed at more length in the next section of the thesis in connection with exports and imports.

In conclusion to the concept of a surplus as a quantity that reduces the total gross or the total net income, it is safe to say that from a social point of view such quantities are usually not surpluses at all. While from the view point of the producers of that commodity, they may look upon such quantities as surpluses, but this is purely a monopolistic point of view.

In so far as these quantities are understood to mean quantities which reduce total returns below total costs or bring smaller
returns than some other crop, they are surpluses from both points of view. Habit, custom, ignorance etc. may cause individuals or a group in society to continue producing one commodity or several commodities when they should be doing something else. For example, the boll weevil destroyed cotton completely in some sections, forcing producers to change to other crops which in some places paid better. In one southern town increased returns were so great that they erected a monument in honor of the Boll Weevil. Society should discover and point out such maladjustments instead of leaving them to go on indefinitely or only to be upset by such a haphazard condition as insect pests.

If agriculture in general is less profitable than other industries, there may be overproduction or a general agricultural surplus which is a problem both for the farmers and the rest of society. The United States Department of Agriculture seems to recognize that such a condition exists. In the Agricultural Outlook for this year, they recommended a reduction in acreage of all major crops. If the farmers followed this advice, they might be worse off as a group.

The analysis for individual products showed that the returns either gross or net, would be greater if the supply were smaller. No doubt this is true for individual commodities, but it does not follow that it is true for all products at the same time. The analysis for individual products is based on past conditions when the supply of all other commodities was nearly normal. Insofar as agricultural products exchange in the market for other agricultural products, the farmers as a group would lose by reducing production. Nearly half of the agricultural products exchange against each other, the rest are exchanged for the products of other industries. A smaller supply of agricultural products
may exchange for the present amount or even a greater quantity of non-agricultural products, but it is questionable if this gain would offset the above-mentioned loss. Regardless of the effect on the farmers as a class, society as a whole would not benefit by following the suggestions of the United States Department of Agriculture. If production were reduced by persuading some of the farmers to abandon their farms, and go into other industries, both the remaining farmers and society as a whole might benefit, but this is entirely different from having each farmer reduce his acreage.
Causes of Farm Distress*

"There is practically unanimous agreement upon the following important causes of the condition in agriculture:

(1) Seasonal variations in yield result in destructive price fluctuations that can only be prevented by effective provision for carrying products over from fat years to lean years, thus securing a price based on supply and demand over a period of years rather than for one year. This is particularly important in the case of cotton and corn.

(2) We produce, and we can not well avoid producing, a surplus above domestic requirements of certain agricultural commodities. This surplus must be sold in competition in the world markets. It is sold at the world price. But the surplus for export is not segregated from the supply for domestic consumption. Consequently the world price fixes the price for the entire crop. Under these circumstances, our agricultural tariff, to a very large extent, is inoperative. The effect of the world price upon the entire crop can be removed by removing the exportable surplus, so that the domestic price will be protected by the tariff whenever this is necessary to prevent domestic prices from being unduly depressed."

Seasonal variations in yields do cause price fluctuations but as shown in Part II of this thesis, they cannot be considered as destructive because the losses from the large crops are offset by the gains from the small crops. It was also demonstrated that, carrying products over from fat to lean years, would have very little effect on the total returns to the farmers and that it might even reduce their total income over a period of years. Price variations cannot be reduced by restricting the market. These fluctuations are greatest for local products such as vegetables and hay. The price of potatoes fluctuates more than that of corn or wheat. This may be due to the fact that potatoes cannot be stored. The relation of the size of the market to the price fluctuations can be better illustrated by wheat. The

yearly price of wheat in England varied more between 1300 and 1850 than it has since a world market developed. Absolute variations are meaningless in this case because in early times the price per bushel was less than the present changes, but the percent changes from year to year are much less now.

Since everyone recognizes that uncontrollable conditions are the most important factors causing variations in production, it seems proper and fitting that society should teach farmers to conduct farming on a business basis, setting up some form of surplus reserves from the fat years to tide them over the lean years. Any large society like the United States with its variety of climate and products need have no fear of a famine. For that reason, it becomes unnecessary to store from fat to lean years as was customary in medieval times.

The second paragraph of the above quotation raises the following questions: Why do we produce more than we need? Is this quantity increasing or decreasing? Where does it come from? Why should governments interfere with free trade? What is the effect of such interference? The purpose of this part of the thesis is to answer briefly the above questions.

Trade between individuals or groups is older than recorded history. Trade is based on the fact that the individual or group has more of one commodity than it needs. As was stated in the introduction,

* United States Department of Agriculture, Year Book 1922, pp. 605-6.
** Mordecai Ezekiel, "Kinds of Agricultural Surpluses", in a paper read before the December 1926 meeting of the American Association for the Advancement of Science, gives the following percentage variations in production due only to yields: 95% in spring wheat, 83% in winter wheat, 85% in corn, 60% in cotton, 62% in oats, and 47% in hay. Estimated average of 75% for all crops.
"needs" is only a relative term. The quantity in excess of needs depends largely on the amount of other goods that can be received in trade. The basis for trade is often referred to as the "Principle of Comparative Advantage". In the last analysis this principle is the same thing as was described in Part II as opportunity costs. This principle is obvious to most people when applied to individuals or small groups, but when applied to the country as a whole, it is often misinterpreted or applied to the benefit of one group at the expense of the rest of society. The cost of doing one thing, of using the land, capital or labor for one enterprise, is the alternative use value of doing something else, of using the land, capital or labor for some other purpose. Insofar as individuals have knowledge and control over what they produce, they tend to produce those things which bring them the largest returns.

The western farmers grew wheat because the soil and climate was well suited to wheat. It was a nonperishable product which could be transported long distances. There were no local markets for fruits, vegetables, potatoes or dairy products and it also required less capital to carry on wheat farming. It was more profitable to raise wheat than any other product. The corn belt has the most suitable soil and climatic conditions for growing corn of any area in the United States. The price of corn would have to fall very low before it would become more profitable to replace corn entirely with some other crop. Likewise the southern states have more nearly the ideal conditions for growing cotton than any other place in the world. The price of cotton could fall considerably before it would pay them to grow some other crop.

There are always transition areas where different crops pay about equally well and it may be a matter of indifference which crop the
farmers raise. Sometimes the advantage that the farmers had, disappears, but due to habit or inertia, they keep on producing the same crop. Price or cost relationship has changed, population has increased, new markets have developed so that the farmers should change from wheat to some other crop or perhaps dairying. In that case from a social point of view, there is a surplus of wheat. Society should teach the farmers the advantages of producing other products instead of leaving it to be forced upon them by rising rents, depleted soil, or by diseases and insect pests. In some regions, the advantages may still be in producing the same crop but the advantages have been reduced because other areas more productive for the same crop have been developed. In that case although the farmers can still make the largest returns by growing wheat, they cannot make as much as formerly. The new regions may be in the same nation or they may be in other countries but the effect is the same. The land value decreases and farmers cannot cover their old costs of production. Their fixed costs of interest on borrowed capital and taxes do not decrease immediately and the farmers find it hard to make ends meet. If prices have fallen below their variable costs, they are soon forced to abandon the farms with complete loss of their capital. If not they may find most of their capital or life savings wiped out, but they can still make as good a living by staying on that land and continuing growing wheat as they could elsewhere, because they have little or no capital to transfer.

In either of the above cases where the farmers are losing because they are growing the wrong crops or where conditions have changed so that they do not make as much as they formerly did, although they grow the best paying crop, they will usually appeal to society for aid-
for some method of raising the price of that product so that they can still make money by producing it. If the competing area is within the same country, they appeal for cheaper credit, lower freight rates from their territory, reduced taxes, and any number of expedients, that would help them at the expense of someone else. If the competing area is outside of the country, they immediately apply for a tariff to prevent outside products from competing in the domestic market. In most instances their request for a tariff is granted, although in many cases not to the extent which they desire. If it happened that farmers were producing what they could, to the best advantage, but were not raising enough of that product to supply the home market, then the tariff cuts down the imports and raises prices so that they receive larger returns. This increases their land values and rents. It also becomes more profitable for other farmers to turn toward growing the same product and domestic competition increases. Costs rise and some of the producers barely cover expenses. Then they practically always appeal for still higher tariffs. In the meantime the rest of society pays more for this product than it would cost if there were no tariff. If it happens that the individual farmers in producing the product that pays best, produce more of it than is needed for domestic consumption at prevailing prices, then part of the quantity is exported, and the tariff has no effect on price. There is no definite exportable quantity which can be segregated from the total supply except by some arbitrary method. The price tends to be the world market price less transportation costs. If some method can be devised whereby a larger quantity can be exported and prevented from coming back so as to cause a relative scarcity in the domestic market, the returns to
producers will be increased at the expense of domestic consumers who are compelled to pay the higher prices. If it was to the farmers' advantage to grow these crops before, it would become more so if their price was increased. More farmers would shift to this crop because it is more profitable than other crops. Land that it did not pay to farm before will be taken into use and land values and rents will increase, and the result will be that many barely cover costs and desire still more help.

The explanation so far is in terms of Agriculture, but it is equally true of industry. Manufacturers clamor for more and more protection. It is only recently that the farmers as a class have realized the fact that they have to bear a share of the expenses connected with protection for the manufacturers. This will be discussed more fully in Part IV.

Many arguments have been advanced for a policy of protection both from an individual and a social point of view. Time cannot be taken to discuss them all but some of the main arguments from a national point of view will be developed. The theoretical ideal is absolute free trade. Each area or person produces the thing or things which it can produce at the best advantage and exchanges these products for the other products it needs. In the world in which we live such an ideal is not possible at present and perhaps never. "There will be wars and rumors of wars" and therefore each nation

* Many books and articles have been written about trade and the tariff. The brief analysis presented in this thesis is based primarily on, F. W. Taussig's "Principles of Economics" 1921, Volume I, chapters 33 and 34; F. W. Taussig's "Free Trade, the Tariff and Reciprocity" 1920; and C. E. Griffin's "Principles of Foreign Trade" 1924.
finds it desirable to produce many products in which it is at a dis-
advantage rather than to be dependent on some other country for its
source of supply. Since individual producers tend to produce those
things that yield them the largest returns, it often happens that the
nation is dependent on other countries for all or a large part of the
supply of certain commodities while it has a larger supply of other
commodities than it needs for domestic consumption. From a military
point of view, it is highly desirable that the country be independent
of other nations in commodities that are essential in time of war.
There is little agreement as to the commodities or the amount of these
commodities that are needed in order to be prepared for war. If this
argument is carried to its logical conclusion, it would mean that the
country would be completely self-sufficient in all goods and have no
trade with other nations. Nevertheless as long as there is no indica-
tion of world peace, protection for some articles is perfectly justi-
ﬁed. This involves some protection for specific agricultural products
as for example, wool, and many forms of manufactured and chemical goods.

Protection usually takes the form of tariffs. This raises
the prices. The consumers pay higher prices for the entire supply
while the government only receives revenue from the fraction of it
that is imported. If the tariff is very high so that nothing is im-
ported, the government receives no revenue while the consumers pay
high prices. For this reason, the amount of the revenue received
from the tariff is no indicator of the amount of the protection that
the industry receives, or its cost to the consumer. Bounties would
be a more desirable method of protection from the consumer’s point of
view because the price of the commodity is decreased rather than increase
and the bounty is only paid on the fraction of the total supply produced in the country. This system of protection takes money out of the treasury which must be raised by other forms of taxes and is not so easy to administer from a fiscal point of view.

In many cases the individual producers do not know that they would have an advantage in certain lines, or the advantage is dependent upon volume and market outlets, which cannot be developed all at once. In such cases, it may be wise for the nation to protect the industry for a certain length of time. This is usually known as the infant industries argument for protection. This argument is generally advanced for industries that are subject to economies from large-scale operation, but in many cases applies to agriculture. For industries, the protection usually takes the form of tariffs. For agriculture, it is usually given indirectly as subsidies to the Departments of Agriculture. These departments conduct experiments to discover new varieties of plants and animals as well as better methods of operating the farms and marketing the products. They also carry on extension work to inform the farmers of the results. Protection by tariffs to infant industries is sound theoretically, but there often arises a question of what industries should be protected on this basis and how long the protection should be continued. In the past there has been no indication that the infants have ever grown up so as not to need further protection. In fact, the protection has been continued after the industry has grown so large that it supplies domestic requirements and has a considerable export business. In theory the tariff should then cease to be effective but it appears that in many instances it has resulted in keeping domestic prices high while goods
have been exported and sold cheaper in foreign countries. This practice is commonly referred to as "dumping".

Dumping interferes with free trade just as much as any policy of restriction and since the country receiving the cheap goods cannot be sure of a continued supply at such low prices, it is justified in passing anti-dumping laws. Canada passed the first general measure applicable to dumping in 1904. This was largely directed against the dumping policy of the United States Steel Corporation. Since 1904 but especially in 1921, Great Britain and most of her self-governing dominions as well as the United States, have passed comprehensive anti-dumping laws modelled after the Canadian law. Ordinary protective tariffs are no more of a safeguard against dumping than a free trade policy if part of the supply is continually imported over the tariff. In case the protective duty is so high that usually there are no imports, then it has some effect against dumping. The effect of dumping

* Jacob Viner, "Dumping", chapter V.
** This type of discrimination may in cases of decreasing cost goods be socially desirable, if the demand in the home market is so inelastic that very little more can be sold at a lower price. The cost per unit of making only the amount needed in the domestic market may be higher than the cost of making an additional supply. If the total supply is sold at the export price, costs are not covered. If part is sold in the home market and part in foreign markets at two different prices, the costs are covered and the price in the home market may be less than if there were no exports. Such conditions are theoretically possible (see A. C. Pigou, Economics of Welfare, ch. XIV, 1920 Edition, "Discriminating Monopolies") but require careful analysis in each case before dumping can be justified on this ground.
*** Jacob Viner, "Dumping", page 86.
on the existing type of commercial treaties has not been definitely decided but it appears as if anti-dumping legislation would not be held contrary to these treaties. Anti-dumping tariffs must necessarily be flexible enough to meet the needs of the situation; that is, the particular discrimination in prices at the time and place, and the tariffs imposed should cease when the dumping ceases and not become permanent trade barriers.

Another argument that has some validity as a basis of national protection for some goods is that of vested interests or vested rights. This gives practically no basis for starting protection or increasing it, but is only an argument for continuing the present amount of protection. If society in the past has encouraged some industry, induced capital to be invested in equipment or buildings which cannot be removed, it has no right to immediately withdraw such protection. It may apply to labor as well as capital. If laborers or farmers have learned an occupation or established homes in certain places because of tariffs, the removal of such protection without some form of compensation is wrong. Protection started for military reasons or for protection of infant industries or fixed rates as safeguards against dumping always give rise to this argument as a basis for continuing the tariffs.

Tariffs may also be levied on some articles for revenue only, which may or may not be a socially desirable method of collecting taxes. As far as this thesis is concerned, interest is not centered in tariffs as a means of raising revenue, but rather the effects of tariffs on production and the reasons for social interference with the free working of the principle of comparative advantage.
It is easy for any particular group to see how they are benefited by a tariff. Dairy farmers gain from a tariff on butter and butter substitutes; flax growers from a tariff on flax; sugar raisers from a tariff on sugar; iron and steel industries from a tariff on steel; etc. The gains are concrete—higher prices and wages to that group, while the losses are spread over the entire society so thinly that they are often unnoticed. Because the gains to each group are evident but the losses are not, many people are deceived into thinking that the whole of society can gain from a system of protection. The problem is similar to that of competitive armaments between nations, or paving and improvements within a city. Each ward in the city pays only part of the cost and the city at large pays the balance. Therefore each ward promotes improvements with the final result that when each has obtained them at the expense of the others, taxes over the whole city become exorbitant.

Because there are so many factors operating simultaneously, it is very often difficult to show the effects of tariffs on specific products, and impossible to show the effect of the same tariffs on other competing products. For example, the tariff on sugar does not cause immediate corresponding changes in price or production of sugar. Neither is it possible to show the effect of this tariff on corn production or price because some land that would normally grow corn has been diverted to sugar beets. The same is largely true of the tariff on flax and the effect on wheat or other competing crop.

In most discussions of the present agricultural problem, reference is made to the rapid expansion or overexpansion of agriculture during the war period, and the impression is usually given
that this resulted in an extra supply of agricultural products. This idea is mostly an illusion and is not based upon the facts. The absolute increase in production during this period is not a good measure of expansion. The increase must be viewed from the previous rate of expansion or in reference to the growth of the population.

Figure 36 shows the change on what may be called the agricultural plant, both in absolute acres and in per capita acreage. Land in farms increased more from 1910 to 1920 than it did between 1900 and 1910, but did not increase nearly as much as it did during the other ten year periods from 1870 to 1900. The first actual decrease in total land in farms has occurred since 1920. Land in farms has decreased in certain areas especially in the east, at other periods, but this decrease has always been offset by increases in other sections.

The per capita land in farms has decreased almost continuously since 1860. There was a small increase between 1890 and 1900. Small changes in any of these figures may be due entirely to changes in the units in which the census data were taken, for example, changing the definitions of what constitutes farm land, improved land, or crop land. Changes of this kind have no effect on trends and constitute only a minor part of the changes between census periods. Per capita land in farms has decreased more than one-third since 1850, and instead of increasing during the war period simply slowed up a little in the rate of decrease.

Improved land constitutes approximately one-half of the land in farms and this is about the same relationship as existed in 1870. Between 1850 and 1880 improved land in farms increased more rapidly than the total acreage in farms. On a per capita basis, it
increased to 1880, remained almost constant to 1900, and has since decreased. The rate of decrease during the war period was practically the same as from 1900 to 1910.

The Census does not give crop land before 1880. Changes in crop land correspond closely to those of improved land, except that there was an actual decrease after 1920. This decrease is approximately equal to the extra increase between 1910 and 1920. Some improved land mostly pasture and hay land, was plowed up during the war period, and it has since been returned to its former use. Some of the decrease is due to the actual reduction in the number of farms from 6,448,343 in 1920 to 6,371,617 in 1925*, a decrease of 76,726 in five years. At the same time, the average size of farms decreased from 148.2 to 145.2 acres, during this period some farmers improved more of their land so that acreage of improved land increased. On a per capita basis, the crop land increased from 1880 to 1900 and has decreased since. From 1910 to 1920, it remained constant showing no expansion on a per capita basis during the war period.

This situation of decreasing per capita acreage appears alarming to some people. They are afraid that the United States is rapidly approaching a situation where the population will press on the food supply. Even during the period when the mid-west was opened for settlement, the population increased practically as fast as the acreage of agricultural land. Mr. E. G. Nourse seems to have the opposite worry. In a paper read before the American Farm Economics Association in December 1926, he forecasts a dismal future for agriculture because it is "faced by portentous technological changes, while its organization and institutions are such as to make extremely difficult, indeed in a

large part impossible, a prompt and suitable adjustment to these circumstances".

The value of land and buildings decreased from 66.3 billion dollars to 49.5 billion dollars from 1920 to 1925, or 16.8 billions which was one-fourth of their 1920 capitalized value. Buildings alone increased a little in value so that if land is considered by itself, it decreased from 54.8 billion to 37.8 billion in value or considerably more than one-fourth.* Part of this decrease is due to a general change in price level and part of it is due to the fact that the population is not pressing on the food supply as fast as was anticipated previously.

Table III shows the acreage of the principal crops in the United States in 1925. Five crops, corn, hay, wheat, cotton and oats are by far the most important crops from the standpoint of acreage. Together they occupy about 90 percent of the total crop acreage. Even oats, the least important of the five, occupies more acres than all the minor crops put together.

<table>
<thead>
<tr>
<th>Crop</th>
<th>Acreage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn</td>
<td>101,631,000</td>
</tr>
<tr>
<td>All hay</td>
<td>74,144,000</td>
</tr>
<tr>
<td>Wheat</td>
<td>52,200,000</td>
</tr>
<tr>
<td>Cotton</td>
<td>45,945,000</td>
</tr>
<tr>
<td>Oats</td>
<td>45,160,000</td>
</tr>
<tr>
<td>Barley</td>
<td>8,247,000</td>
</tr>
<tr>
<td>Grain sorghums</td>
<td>4,120,000</td>
</tr>
<tr>
<td>Rye</td>
<td>4,083,000</td>
</tr>
<tr>
<td>Potatoes (including sweet potatoes)</td>
<td>3,891,000</td>
</tr>
<tr>
<td>Flax</td>
<td>3,012,000</td>
</tr>
<tr>
<td>Tobacco</td>
<td>1,747,000</td>
</tr>
<tr>
<td>Beans</td>
<td>1,579,000</td>
</tr>
<tr>
<td>Peanuts</td>
<td>982,000</td>
</tr>
<tr>
<td>Sugar beets and cane</td>
<td>961,000</td>
</tr>
<tr>
<td>Rice</td>
<td>904,000</td>
</tr>
</tbody>
</table>

* Preliminary report of 1925 Farm Census.
** United States Department of Agriculture Year Book 1925, page 1356.
Figure 37 shows the percent of improved land in some of the most important crops by census periods since 1880. The five crops rye, potatoes, barley, flax and tobacco shown at the bottom of the graph are drawn to a scale four times as great as for the other crops. Even with this larger scale the changes appear smaller and rice takes such a small percent of the acreage that it cannot be shown. To show more accurately the relative changes in percent of land in various crops, the same data and sugar and rice are drawn to a logarithmic scale in Figure 38. It is now apparent that the relative changes have been greatest in those crops which occupy a smaller absolute acreage.

Climatic requirements of corn are responsible for most of the changes in the percentage of improved land in the crop. By 1900, the corn belt was settled. Since that time increases in farm land have taken place mainly in the North and West in areas too dry or too cold for the growing of corn. The corn area has been expanded both to the North and West, but this increase in corn acreage has been offset largely by a decrease in corn acreage in the South and East with the result that, the total corn acreage increased very little, since 1900. Some of the apparent decrease in percentage of improved land in corn, is due to the fact that more and more corn is cut for silage and this acreage is included in hay and forage.

Wheat acreage as a percent of improved land has increased every other census period since 1870. The first two of these increases correspond to the periods of most rapid expansion of land in farms. Wheat has been the pioneer cash crop in this country. Between 1870-1880 there was a considerable increase in wheat production in the Great Lakes Region, especially Ohio, Indiana, Illinois, Michigan, and Minnesota.
Figure 37.

Per Cent of Improved Land in Various Crops.

- Corn
- Wheat
- Oats
- Cotton
- Rye
- Barley
- Potatoes
- Tobacco
- Flax
Figure 38.

Per Cent of Improved Land in Various Crops.
Considerable expansion also took place in the Pacific coast states.
From 1880 to 1890, there was not only a relative decrease in wheat
acreage, but an absolute decrease from 35.4 to 33.6 million acres.
During this period, wheat acreage decreased especially in the East,
because of higher costs of production, while at the same time there
was considerable increase, especially in Kansas and the Great Plains
region. In spite of the decrease in acreage, production increased
about 10 million bushels. Between 1890 and 1900, the acreage increased
almost 20 million acres, especially in the Red River Valley and Kansas,
Nebraska, and Oklahoma. During the same period, there was considerable
decline in acreage in California, due to competing crops. Between
1900 and 1909, wheat acreage decreased about 5 million acres, especially
in Minnesota, Iowa, the Ohio Valley, and California due to com-
peting crops, diseases, ill effects of single cropping, and competition in world markets by new countries. During this period, there
was some expansion of specialized wheat farming on prairie land which
was favored by unusually good weather conditions. The increases were
mainly in North Dakota, Montana, and Kansas. From 1910 to 1920, the
wheat acreage under the stimulus of higher prices, increased from
44.3 to 73.1 million acres. Increased acreage took place everywhere
except in Minnesota and South Dakota. The center of wheat production
shifted from the Spring Wheat Area to the Winter Wheat Area in Kansas,
Illinois, Oklahoma, and Missouri. These became the leading states.
Between 1920 and 1925, wheat acreage decreased almost one-third to
50.9 million acres. Decreases took place everywhere except in Mont-
tana, but especially in the corn belt where the greatest increase
took place during the war. The absolute profitableness of growing
wheat, as well as the relative profitableness as compared to other crops, disappeared after the war. The decrease in acreage in the Western states is also partly due to several years of unfavorable weather.

Oats are grown primarily for feed and are used in rotation with other crops, especially corn. The production of oats has shown considerable increase since 1870. Between 1880 and 1890, the production approximately doubled, and since has increased about as fast as improved land in farms. Between 1920 and 1925, the acreage increased about 5 million acres. This was mainly due to a shift from wheat to oats in the corn belt. The percent of improved land in cotton has increased rather uniformly, except during 1910 to 1920, when it remained fairly constant, and the rapid increase since 1920. Low yields due to the boll weevil and high prices made cotton raising relatively more profitable than other crops. The big increase in cotton acreage took place in states west and north of the old cotton producing region. The shift was largely from wheat to cotton in Texas, Oklahoma, Arkansas, and Missouri. Cotton yields in this region are not large per acre, but farming is practiced by large scale methods, and the cost of production per unit is very low. This increase along with reduced damage by the boll weevil is largely responsible for the present large production of cotton.

Rye is not an important crop because there is no great demand for it domestically and foreign countries usually grow their own. As a percentage of improved land, rye acreage decreased rapidly from 1870 to 1900. During the war, the price of rye followed wheat closely and under the stimulus of higher prices, acreage
increased from 2.5 to 7.1 million acres, a much greater expansion than took place in any other crop. The increase was mainly in Michigan, Minnesota and North Dakota. The price of rye did not decline as rapidly as that of wheat and other products, and since rye is a surer crop than wheat in many regions, the acreage has not decreased as fast as that of wheat. Rye acreage is now approximately double that of 1910.

The percent of improved land in potatoes remained fairly constant up to 1910, and has since decreased. The decrease was mainly in the Eastern states and through the Ohio valley, including Wisconsin. While total acreage decreased, acreage in Maine and Minnesota increased considerably, as did the acreage of early potatoes in the South, especially in Florida.

Barley acreage has increased rapidly in the United States from 1870 to 1910. The main increase was in Wisconsin, Minnesota, North and South Dakota. The decrease from 1910 to 1920, was mainly due to a shifting to wheat or rye production during this period. Prohibition may have had some effect, but barley acreage has maintained the same percentage of improved land since 1920. This is due to the fact, that barley is being recognized as an important feed crop as a substitute for corn in regions too far north to grow corn.

Beginning with 1890 flax acreage increased up to 1900, but has decreased rapidly since, except for the period following 1920. Flax is primarily a pioneer crop for virgin soil and the leading states in the flax production have moved westward with the population. Ohio was the leading state by 1870, then Illinois, Iowa, Minnesota and North Dakota which now produce about half of
the total output. Montana and Wyoming are beginning to raise considerable flax and may soon be the leading states. The chief reasons for the decline in flax production is the relative profitableness of growing other crops, which in turn depends largely on foreign competition. From 1903 to 1924, there was a correlation of -.77 between the wheat and flax acre values and the change in flax acreage planted the following year.* Every time the flax value per acre was higher than that of wheat, there was an increase in acreage of flax the next year. During the war, it became more profitable to grow wheat than flax, and therefore flax acreage decreased. Since the war the price of flax has been maintained at a higher level than that of wheat partly because of the high tariff on flax, and partly because world production of flax has not increased as rapidly as the demand. Argentina has supplied more than half of the flax seed entering the world commerce since 1900; about 90 percent of its entire production is exported. Flax raising is rather uncertain and since yields per acre are usually low, it is only profitable in new countries or areas.

Tobacco acreage decreased a little between 1880 and 1890, and since 1920, but the acreage has increased relatively more since 1880 than that of the more important crops. There have been no notable changes in the areas producing tobacco during this period. Tobacco acreage per farm in regions growing tobacco is very small, only a few acres per farm. The possible expansion within the areas growing tobacco at present is very great.

Sugar production in the United States has increased rapidly since 1890. This is primarily an increase in the beet sugar

* Monthly Supplement of Crops and Markets, April 1925, p.117.
acreage. The expansion of beet sugar acreage has been greatest in Utah, Colorado, California, Michigan, Wyoming, and Ohio. In the first three states named, there has been a decrease since 1920, while in the others, there has been a continued increase. The acreage of cane sugar has decreased considerably since 1910. The general trend of the purchasing power of sugar has been downward in spite of the tariff. This is largely due to the decreasing costs of production of cane sugar in Cuba and other parts of the world, where the climatic conditions are more favorable for its production. The consumption of sugar in the United States has increased steadily from 40 pounds per capita in 1870, to over 100 pounds per capita at the present time. The rate of increase of domestic production has been more rapid than the rate of consumption, but at present the continental United States only produces about 23 percent of the total supply, 18 percent from beets and 4.7 percent from cane.

Rice acreage increased rapidly from 1890 to 1920. Before 1890, South Carolina was the leading state, in 1890, Louisiana became the leading state and has since held that place. By 1900, Texas became an important producer and by 1910, it ranked second. Arkansas became an important producer by 1910, and ranked third. Commercial rice production began in the Sacramento Valley in California in 1912, and by 1919, California ranked second in the total production. These shifts in production have been due largely to the discovery that rice can be grown by the same large scale methods as have been applied to wheat or other grain crops as far as harvesting and threshing is conceived. Rice is now sown with an ordinary grain drill. The land is flooded and before harvest the water is drained off so that
Figure 39.
Per Capita Acreage of Various Crops.
machinery can be used in the fields. By these methods, rice can be profitably grown in the United States in competition with Asiatic countries.

Figure 39 shows the acreage of these crops reduced to a per capita basis. This graph shows the same relationship between crops as was shown by Figures 37 and 38. Since per capita acreage of improved land in farms has decreased during the period, it is to be expected that the per capita acreage of the most important crops has also decreased. The largest per capita decrease is in the case of corn. The trend of wheat acreage is also downward. Oat acreage per capita increased up to 1890 and has since remained practically constant. Per capita acreage of cotton has increased slowly since 1870, but the increase has been quite rapid since 1920. Barley acreage increased more rapidly than the population up to 1910, and has decreased since. Per capita acreage of rye shows a decided downward trend except for increases during the war period. Potato acreage increased as fast or faster than the population up to 1910, and has since fallen behind. On a per capita basis, flax acreage has a decided downward trend. Tobacco acreage shows some tendency to increase faster than the population. Rice acreage shows by far the greatest change during the period.

Figure 40 shows the per capita production of various crops. This is very similar to the trends in per capita acreage. The variations in yields are usually greater in individual years than variations in acreage, so that the similarity of these two graphs is more surprising than their differences. Per capita production of potatoes follows the acreage according to this diagram but it is apparently wrong, because if individual years are plotted and a trend fitted to them, per capita production shows a slight increase
Figure 40.
Per Capita Production of Various Crops in U.S., except Tobacco in Pounds, Cotton in Bales.
rather than a decrease. Per capita production of flax shows an increase up to 1900, while acreage was decreasing in this case, the per capita production is very nearly correct. The per capita production of rice shows a much greater increase than that of acreage. This is likewise correct because the average yield of rice per acre increased from 33.2 bushels per acre (1909–13) to 38.0 (1914–20). The yield of rice varies only slightly from year to year because the water supply is controlled. This increase is mainly due to the development in California where yields are higher.

Taken as a group, crop production per capita has decreased very little since 1890, although there has been a per capita decrease in improved land in farms. Figure 41 shows this more clearly; the per capita production of all crops varies greatly from year to year. It increased up to 1898 when it reached its maximum. Since 1906, the trend has been downward. Even during the so-called war expansion the per capita mass production of crops was less than the five year prewar average. The index of total production shows rather a steady increase since 1890. The maximum production was reached in 1919, but this is only a trifle greater than it was in 1915, before war prices had had much influence on productions. On the whole, this index does not show any abnormal expansion of total production from war price stimulation. Of course there was a shifting from some crops to others and on this basis, there was expansion, especially of wheat and rye, but this was largely accomplished at the expense of other crops.

According to Figure 41 the mass production expressed on a 1900–14 base was approximately 82 in 1900, and 112 in 1925 or there was an approximate increase of 30 points since 1900 and 12 points since 1920–14. If the data for improved land shown in Figure 36 is
converted to an index of acreage in 1910, the index for 1900 is approximately 87 and for 1925, 106. This shows an increase in improved land of 19 points since 1900 and 6 points since 1910. This shows that mass production has increased about 11 points more than improved land since 1900 or 4 percent more since 1910. This data although not exactly accurate surely indicates that yields per acre have been increasing during the period.

The National Industrial Conference Board arrives at just the opposite conclusion.* They use an index number of 9 principal crops published in the 1923 Year Book** which shows the yield per acre decreasing since the average for 1903-7. They compare this not with changes in total acreage of improved land but with per capita acreage and make the following statement:

"The decline in both respects after 1900 suggests increasing capital and labor costs and conditions adverse to the maintenance of soil fertility."

The decline in the per capita acreage of improved land is rather the natural consequence of an increasing population with a limited land supply than increasing capital and labor costs. Of course most of the easily improved land has been improved and additions to the land of this kind are more expensive. The second part of the above quotation is far from correct. The index number published by the Department of Agriculture weights cotton rather heavily. If cotton is omitted the index number shows a gradual increase in yield per acre. The decline in cotton yields per acre is due mainly to the effects of the boll weevil which has nothing to do with

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** United States Department of Agriculture Year Book 1923, page 464.
the maintenance of soil fertility. As pointed out previously, cotton planting has moved to the drier regions further west where yields per acre are lower, thus also helps to reduce average yields. Any index of crop yields for the whole United States is apt to be misleading because the new lands taken in are usually poorer and therefore reduce the average yields for the country as a whole.

Figure 42 shows an index number of the crop yields per acre east of the Mississippi River. This index does not include cotton, and although not an ideal measure of crop yields for the whole United States, it shows that there is no falling off of yields since 1890. Yields increased about 30 percent from 1890 to 1920. Since 1920, they have been a little lower than during the war period, but since the difference is small, it may be due to weather conditions. It is also highly probable that yields are falling off a little due to less intensive cultivation. Prices of farm products have been relatively low, and it is to be expected that farmers till the land less intensively. G. F., Warren in discussing the paper* by Dr. Nourse cites this index number of crop yields as a proof that yields increase or decrease with agricultural prosperity. This is not conclusive proof, but the sales of fertilizers tend to show that it may be true. Fertilizer sales dropped from 7,670,000 tons in 1920 to 4,670,000 tons in 1921, and have not yet regained the 1913 level.**

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* Journal of Farm Economics, January 1927, pp. 34-36.
Figure 42:
Index Number of Crop Yields per Acre in States East of Mississippi River.
1866 = 100.

(Corn, Wheat, Oats, Barley, Rye, Buckwheat, Potatoes, Hay)

Source: Journal of Farm Economics, Jan. 1927, p. 34.
The census data for animals show a more striking decrease per capita than that of crops. Figure 43 shows that the per capita number of farm animals is decreasing. Hogs and sheep have decreased the most. Cattle other than milk cows increased up to 1910 and have decreased ever since. The separation of this class of animals into pure beef and other cattle was not made prior to 1900 and since then the per capita number of beef cattle has decreased. Milk cows have decreased almost continuously since 1850. Horses and mules increased up to 1900 and have since decreased. The most rapid decrease was between 1920 and 1925 when there was an actual decrease of 2,933,185 horses and mules or nearly 15 percent of the numbers on the farms. Considerable decrease has also taken place in the numbers in cities and villages. It is estimated that it requires about four acres of fertile corn belt land to feed and maintain one horse a year. Therefore the decrease in horses and mules has been to convert 14,000,000 acres of fertile corn belt land or its equivalent to the production of human food rather than animal food.*

Since other animals have not increased to consume the feed usually fed to horses and mules, there has been a real decrease in the domestic demand for some crops especially oats, corn and hay. Expressed in terms of one crop alone, it is equivalent to a decrease in demand of one-third of the total acreage of oats. Poultry alone shows a tendency to increase faster than population, but the statistics for poultry are not very reliable. The same may be said about the other figures because changes in dates of taking the census makes considerable difference in the number of animals on the farms.

* Leaflet #150, Horse Association of America, Union Stock Yards, Chicago.
Figure 43. Per Capita Number of Farm Animals.
(Poultry in Units of 10)
This does not affect the last two periods as the census was taken on the same date. If estimates of the United States Department of Agriculture are used in place of the census data the two do not check very closely but show the same general trends.

A graph showing the number of animals per 1000 acres of improved land is so similar to Figure 43, that it is not given here. Practically the only difference is a slower rate of decrease since 1900. There is no indication that agriculture is being intensified by the use of more livestock. Of course the numbers of livestock on specific dates is not a good measure of degree of intensity in the use of livestock. The turn-over in case of cattle and hogs is greater now than several years ago. More farmers raise two litters of hogs per year. Hogs are also fattened for market younger than they were 20 to 30 years ago. This gives a greater production of pork per year from a smaller number of hogs than formerly. The 1925 Census came at a lower point in the hog production cycle than that of 1910 or 1920, and therefore the decrease since 1920, appears greater than it really is. The system of raising cattle has also changed towards that of early marketing— the production of "Baby-beef". A smaller number of animals are now kept on farms to produce the same or a greater amount of meat. In the case of dairying, many of the inefficient cows have been sold as beef while the breeding of better cattle has improved the quality of the herds so that a decrease in actual numbers does not mean a decrease in production. No data on the production of animal products are available in any satisfactory form, but there is no indication of any rapid expansion either during or after the war.
The 1922 United States Department of Agriculture Year Book,* gives a table which shows the estimated value at farm prices of crops and animal products and the percentage that each is of the total value. The actual amounts are not significant since they change with the price level, but the percentage that each is of the total is interesting since it shows somewhat the relative profitableness of crops and livestock, and indicates shifts from crops and livestock if there are any. The data begins in 1896 with livestock products equal to 36.4 percent of total value. Year to year variations are less than 1.5 percent above or below this figure up to 1915, when it was 35.9 percent. The next year it fell to 32.5 percent and then to the lowest point 30.3 percent in 1917, but in 1918 and 1919 it rose to 36.2 and 35.2 respectively. This drop in 1917 is partly due to the increased foreign demand for crops and because the price of animal products did not rise as rapidly. Neither did they fall as rapidly in 1920 or 1921. In those years animal products rose to 40.5 and 44.1 percent. The producers of animal products were not as hard hit by the low prices as those of crops. This led to considerable discussion of diversification and increased production of dairy products. The number of milk cows or other animals does not show any increase during this period. By 1922 the percentage that animal products were of the total value fell back to 37.4 and if corresponding figures are calculated for 1923 and 1924, they are 37.4 and 34.3. This indicates that there has been no trend in the relative proportional value between the animal and crop products since 1897. The changes during and after the war are rather a short--

* United States Department of Agriculture Year Book 1922, page 985.
time change in price relationships than any indication of a shift from crops to animals.

From the above data on crops and animals, there is no indication of any general expansion during the war period and no indication of any decided increase in the total production since the war. Therefore the so-called agricultural surplus cannot be an increase in quantity or the number of physical goods.

Figures 44 and 45 show the percentage of the total production exported or imported. Data for corn and wheat are given as net exports in the United States Department of Agriculture Year Books. Data for the other products are calculated by finding the difference between the exports and the imports as recorded in the year books and expressing this as a percentage of the total production. Imports of cotton are very small and consist of the long staple variety only. Cotton is by far the major agricultural export of this country. From 1866 to 1913, there appears to be no big change in the percentage of cotton exported. In 1911, exports reached their maximum in absolute number of bales. Eleven millions were exported, but since production was large, 16 million bales, there was no decided increase in the percent exported. The greatest change came in 1914 when production was large and exports fell off on account of the war. Exports were small in actual amounts during the war, falling to 4.6 million bales in 1917, while production was nearly normal. In 1921, the production was only 7.9 million bales so that exportation of 6.7 million bales was a very high percentage of the production. During the four years from 1921 to 1924, the boll weevil greatly reduced the production, so that there was not
Figure 17.
Per Cent of Production Exported.

COTTON

WHEAT

RYE

CORN

1865 1870 1875 1880 1885 1890 1895 1900 1905 1910 1915 1920 1925

PERCENT
as much cotton available for export. This resulted in high prices which greatly stimulated production not only in the United States but in many other parts of the world. The fear of a cotton shortage caused European countries to look elsewhere for their supply. Production in many regions is experimental, but they may find conditions favorable and become great competitors with the United States in the world market. Control of the boll weevil through dusting, along with unfavorable weather for its development and increased acreage, caused a production of 16 million bales in the United States in 1925 and about 18 million bales in 1926. This ought to increase the percentage exported to the pre-war level. The changes in the percentage of cotton exported are due to the war and decreased production following the war.

Some wheat especially that of a high quality is imported for blending purposes in the making of patent flour. The percentage of wheat exported varies considerably from year to year but follows to some extent the shifts in acreage previously described. The percentage of exports during the war years, was no greater than between 1870 and 1903, but they were larger than during the period 1904 to 1912. The large exports since the war would hardly indicate that the foreign countries have been taking less of our wheat so that this is the cause of the low prices during the recent depression. United States acreage decreased about one-third between 1919 and 1925. In many other countries acreage increased during the same period, in Canada about one-fourth, in Argentina about one-third, while in Australia, it almost doubled, and in Russia it more than doubled, but is not yet back to the pre-war level. Total world production in 1925
was approximately equal to the pre-war average.* Apparently it is profitable to grow wheat in other countries even if it is not so in the United States.

Exports of rye vary greatly from year to year. They seem to depend very largely on production. During the war, rye production more than doubled in this country and a larger percentage of it was exported because of the high prices. Since the war exports have remained high. As in the case of wheat, there is no indication that foreign countries have reduced the quantities taken since the war.

Only a small percentage of the corn produced is exported. Exports increased a little with the low prices of corn in 1921 and 1922. The amount of corn exported seems to depend to a large extent on the price of corn in this country. It is hardly a determining factor in establishing that price.

Tobacco imports are approximately equal to one-tenth of the exports but are of a different grade and quality. Production and quality vary from year to year and are the main factors in determining net exports. There seems to be no decided trend in exports. They have been fairly stable and have remained high during the period of agricultural depression.

Barley shifted from an import to an export basis long before prohibition became effective. There was no increase in exports following prohibition and there seems to be no tendency for exports to decrease.

One glance at the line for rice suggests why this commodity was included in the proposed legislation for controlling the surplus.

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* United States Department of Agriculture Year Book 1925, pp. 751-2
Production has increased so fast since 1905, that imports have been replaced by considerable exports. The percentage of the crop exported is now almost the largest for any agricultural commodity. This is not the first time rice has been exported. Rice production was begun in South Carolina in 1694 and rice was exported up to the Civil War. From the Civil War to 1914, the imports exceeded the exports. From the data on production, exports and imports, it appears that the consumption of rice in the United States is fairly inelastic and that any increase in production means increased exports.

Flax changed from an import to an export basis between the Census of 1890 and 1900, but by 1910 it was back on an import basis. The trend has been to import a larger and larger amount. In 1919 about $3\frac{1}{2}$ times as much flax was imported as was produced.

A small amount of the poorer grades of wool is exported, but this country has always been an importer. The trend is to import a larger and larger amount. This trend is almost identical with that of sheep production.

Sugar is perhaps one of the most important of the agricultural commodities imported. It would be impossible to show it on the same graph because about five times as much is imported as is produced. About 60 percent of the imports come from Cuba at the present time.

To show data for pork and beef on a similar diagram is almost impossible because the exports and imports are divided into so many classes of products. Then too production data are usually stated in numbers of the live animals. Since swine are included in the basic agricultural commodities that were designated in the McNary-Haugen Bill, it is interesting to note that on the average,
the exports of products from swine are about 15 percent of the total production. These exports seem to have an indirect relation to price. Exports have been largest when the price was low with the exception of the abnormal demand during the war which caused both prices and exports to increase. The exports of pork and its products by averages of periods was as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1892-96</td>
<td>1,052,000,000</td>
</tr>
<tr>
<td>1897-91</td>
<td>1,528,000,000</td>
</tr>
<tr>
<td>1902-06</td>
<td>1,242,000,000</td>
</tr>
<tr>
<td>1907-11</td>
<td>1,029,000,000</td>
</tr>
<tr>
<td>1912-16</td>
<td>1,109,000,000</td>
</tr>
<tr>
<td>1917-21</td>
<td>1,637,000,000</td>
</tr>
<tr>
<td>1922-25</td>
<td>1,661,000,000</td>
</tr>
</tbody>
</table>

The largest export of pork and its products was 2,705,000,000 pounds in 1919. The second largest was 1,934,000,000 pounds in 1924. Exports since the war, have remained above the pre-war level but are declining at present. This is due mainly to the decrease in hog production during the last two years.

Exports or imports of all commodities combined cannot be shown except in value terms. Value in dollars depends largely on the price level and unless deflated by some index number do not show conditions very accurately. Exports and imports show very clearly the general trends and at the same time make allowance for the changes in the general price level. This is shown in Figure 46 by 5 year averages from 1852 to 1901 and from then on by years. The general trend in agricultural exports as a percentage of all exports since 1880, is downward at almost a uniform rate. The big drop in 1916-17 is not due to any falling off of actual agricultural exports but to

* Based on data in the United States Department of Agriculture Year Books for 1920 and 1925.
Figure 46. -Per Cent of Foreign Trade Represented by Agricultural Products.
(5 Year Average up to 1902)

the large increase in the manufactured ones, especially war material. There has been no decrease in actual value of agricultural exports since 1850. There has been a gradual increase, except during the war period when they rose rapidly. Following this they declined to the previous upward trend. The general decline in the percentage that agricultural products are of all exports, is due to the increase in manufacturing within the United States. More manufactured goods are exported and less are imported. This also accounts for part of the upward trend in imports. Imports of agricultural products have increased in actual amounts. This is due to the fact that population has been increasing faster than agricultural production and because the standard of living has been rising. People demand a greater variety of goods, especially tropical products and silk none of which have been successfully produced in this country. The size of the United States makes it cheaper to import into some sections rather than ship from great distances within the country. An example of this is the transporting of milk and cream into New York and the New England States from Canada. The rapid increase in the percentage that agricultural imports are of the total imports from 1915 to 1922 is due mainly to the falling off of manufactured imports during and after the war. Beginning about 1850 the value of agricultural exports was approximately twice the value of agricultural imports. Since that time, they have approached equality. 1923 is the only year in which the value of such imports exceeded the value of the exports, and then only by a small margin. The United States is approximately self-sufficient at present, insofar as agricultural products are concerned. It is not in regard to individual products but all
agricultural exports just pay for all agricultural imports. The present conditions may be considered ideal. Agriculture is neither over nor under-expanded. In the past agricultural exports have exchanged for manufactured goods. At the present time, exports and imports of many manufactured goods just about balance. If past trends continue, it appears as if the United States would soon cease to produce enough agricultural products to pay for the agricultural imports. Such a condition may not be socially desirable, but it ought to benefit the farming class in this country. The United States can never become as highly industrialized as England or Belgium because of its size, but sections in the East, especially in New England, approximate the same conditions. No one is wise enough to determine the best proportions between agriculture and other industries, but it seems as if agriculture ought to be maintained at its present status so that exports and imports of farm products balance.

Specific attempts have been made to encourage the production of many agricultural commodities now imported. The United States Department of Agriculture experimented for years with tea, also with silk, and a few other commodities, but finally abandoned the projects. Encouragement to certain products has been given by tariff protection. There are tariffs on most agricultural products, but the tariff on those of which there are net exports has little or no effect, except on specific grades. For example, the raising of the tariff on wheat from 30 cents to 42 cents per bushel in March 1924, greatly decreased the importation of high grade Canadian wheat for consumption purposes, but had practically no effect on the average price of wheat.

The tariff on barley was raised from 10 cents per bushel to
to 30 cents per bushel in 1890 and there was a great decrease in imports. But this decrease was rather due to the increased production of barley in this country than to the tariff. Since this increase continued after we began to have a net export of barley in 1892 and has continued ever since, it seems as if the increased tariff was not responsible for the change.

In the case of sugar, the tariff undoubtedly has an effect both on production and price in this country since most of the sugar is imported. Changes in production, imports, or price do not correspond very closely with changes in tariff rates. The trend in purchasing power of sugar has been downward since 1870. The trend in consumption has been up. The tariff rate has varied from 3 cents per pound in 1870, to nothing in 1890. Between 1890 and 1894, there was a bounty of 2 cents per pound on production. The present preferential rate is 1.78 cents per pound. This rate applies to sugar from Cuba. Sugar from the island possessions and the Philippines is admitted free. Since most of the sugar is imported, the price tends to be raised above that of the exporting country by approximately the amount of the tariff. Over 11 billion pounds of sugar are consumed in this country annually. The price is increased to the consumers approximately 215 million dollars. The United States Treasury gets about 125 million dollars, of this amount, and the producers the rest or 90 million dollars. Producers within the continental United States receive about 50 million dollars and those on the Islands 40 millions.

The amount the producers get is not necessarily a gain to them as is often supposed. Those who would produce sugar instead of other crops if there were no tariff, gain the full amount. The rest
gain only the amount that the net returns from sugar are greater than from the next competing crop. To many, there is no gain at all since sugar pays only as well as the next best crop. From a social point of view, all the extra amount paid such producers of sugar is waste. It is used up in the costs of having a commodity produced for which the soil and equipment is not as adaptable as that of other countries. There is some basis for the argument that the production of sugar beets improves the soil and does not remove the plant food. It is impossible to measure the importance of this in terms of dollars and cents. If the farm population consumes as much sugar as the average person in the United States, they consume a little more than they produce, so that even to the agricultural class, there is a net loss in real income from the sugar tariff.

Flax can hardly be said to have any beneficial effects upon the soil. At present it has a very high tariff of 40 cents per bushel, but still the production only satisfies about half of the home supply. Just a small part of this tariff can be said to represent an increased income to the producers. It is estimated that the price to producers in North Dakota, the center of flax production in this country, is increased only about 20 cents by this tariff.* As explained in the case of sugar, only the producers who would grow this crop if there were no tariff, gain the full amount of the increase in price. Most of them gain very little and many nothing. The tariff only tends to make flax production as profitable as that of wheat in many sections.

* Omar O. Churchill, "The Economics of Flaxseed Production". Unpublished thesis submitted to the Graduate School of the University of Minnesota, 1927.
Wool is one of the main animal products imported to any great extent. The changes in production and imports do not correspond very closely to the changes in the tariff. In 1883 the tariff was reduced from 32 to 30 cents. Imports increased slightly while production decreased a little. In 1890 the tariff was increased to 32 cents and production rose a trifle. In 1893 the tariff on wool was abolished and imports increased considerably while production decreased. In 1897 the tariff was re-imposed at 33 cents. Imports decreased greatly. Perhaps this was due to the accumulation of large stocks when there was no duty. From 1897 to 1913, the tariff remained at 33 cents. During this period there are variations in production, and imports are practically as great as when there were tariff changes, so that it is impossible to estimate how much effect the tariff had. From 1913 to 1921, wool was again on the free list, and imports increased but production remained fairly constant. In 1921, a tariff of 45 cents was levied, which was reduced to 31 cents the next year. Production decreased from 1919 to 1922 and increased again in 1923, 1924, and 1925. Wool production in this country increased up to 1885 and since has remained constant as far as trends are concerned. 308,000,000 pounds were produced in 1885 and 301,000,000 pounds in 1925. The largest production was 328,000,000 pounds in 1909, and the smallest production since 1885 was 265,000,000 in 1922. It seems as if a tariff of about 30 cents per pound is necessary in order to induce farmers in this country to produce half of the amount consumed at the prices that come to prevail. Farmers as a class may gain a little by this tariff depending of course on how many of the sheep
raisers are marginal or nearly marginal producers of sheep.

Minnesota does not produce very much of any of the imported commodities discussed so far. There is some sugar, flax, and wool produced in this state, but undoubtedly most of the producers of these goods do not benefit greatly by the tariff. It only makes these commodities pay as well or a little better than the next best crop or product. Minnesota is one of the important dairy states and would produce dairy products even if there were no tariff on butter or similar products. When the tariff on butter is effective in raising the price, there is a real gain to the farmers in this region, but of course the rest of the people in the United States pay higher prices.

Figure 47 shows the amount of the tariff, the difference between the New York and the Danish price of first-quality butter, and the net imports and exports. The quality of exported butter is lower than that of the imported butter, and the variations in the rates of exchange complicates the situation so that complete analysis is difficult. Interest here is only in the general aspects of the problem. This the graph shows very clearly. The United States varies from an import to an export basis as far as butter is concerned. The tariff in general is effective when there are imports, but not when there are exports. In cases of this kind, it appears as if the tariff contributed to variations in price, rather than to act as a price stabilizer. A small change in production may shift this country from an import to an export basis and cause a change in the United States price equal to the change in world price plus the amount of the tariff and transportation costs. If the dairy
FIGURE 47. A COMPARISON OF SPREADS IN PRICE BETWEEN NEW YORK AND DENMARK, AND THE NET MOVEMENT INTO FOREIGN TRADE IN THE UNITED STATES, WITH TARIFF CHANGES FROM JUNE 1912 TO SEPTEMBER 1926. THE FIGURE IS DESCRIBED IN DETAIL IN THE TEXT.

Source- Thesis by Thomas G. Stitts. December 1926, Figure XIV, p.105.
farmers are looking for stabilized prices, this tariff surely does not help them. Of course they get as much as they would if there were no tariff, when there are net exports. If production is short of domestic demand, they get a bonus from the consumers in the United States, sometimes equal to the amount of the tariff. The dairy farmers as a group cannot expand production any faster than consumption in this country increases, and hope to benefit by the tariff, unless they can successfully shut out butter substitutes. To accomplish this, they are asking for increased taxes and tariffs on oils and fats imported or produced in the United States. If they are successful in this attempt, they gain at the expense of the rest of society.

We do not produce all the wool, flax and sugar that is consumed in this country, because at present prices, it is more profitable for the farmers to raise other things. If the tariffs were increased enough, it would be possible to produce all that is consumed of these commodities. This would reduce to some extent the exports of other commodities. A few simple approximations can be made to show what might happen and what effect it would have on exports. In the case of sugar, about half of the supply is imported from Cuba, the rest comes from the island possessions of the United States. If the tariff were increased to 5 cents or more per pound consumption would decrease considerably and if production were doubled, there would be an increase of a million acres in sugar beets. Assume that this increased acreage came entirely from corn land, then it would be equal to one percent of the 100 million
acres of corn. Since only about one percent of the corn is exported, this would remove the exportable surplus of corn. Likewise for the purpose of illustration, if the tariff on flax were increased to one dollar per bushel, it would be more economical to leave buildings unpainted and to sow more flax. At present 3 million acres produce two-thirds of the amount used. Another million acres could easily produce the extra quantity needed at a higher price. Assuming that this replaced barley of which approximately 13 percent is now exported from the 8 million acres planted to that crop, then flax production would eliminate barley exports. Likewise a tariff of perhaps 80 cents per pound on wool, would make the United States self-sufficient in that commodity. Few people can afford to wear wool at the present prices, so that it would not require twice our present number of 40 million sheep to supply the extra wool needed if imports were prohibited. At present over 50 percent of the rye from 4 million acres is exported; 2 million acres of this could be used for sheep. Since 15 percent of the hogs are exported, they could also be replaced by sheep. There would be extra feed created in the form of sugar beet pulp and linseed oil cake. These changes would surely provide feed and pasture for the additional sheep. This process of making the United States self-sufficient in the three major agricultural imports of which we now produce a part, would remove most of the minor exports. There would still remain about 60 percent of the 45 million acres used for cotton and about 33 percent of the 52 million acres used for wheat, not to mention tobacco or rice, or the equivalent of 55 million acres. To be completely self-sufficient in all agricultural products would be almost impossible. Some of the
southern cotton land could be used for raising tropical products such as coffee, or rubber, but more of these commodities can be obtained by raising cotton and exporting it. If there were no exports of agricultural products a great many acres would remain idle.

It is apparent to most people that the United States as a whole would lose by trying to be completely self-sufficient in all agricultural products. Some products could only be raised in greenhouses at prohibitive costs. The question of how far the policy should be carried can never be settled permanently. Society may be willing to accept small losses continuously rather than take the risk of great losses in time of war. It is even doubtful if the farmers as a class gain by the present tariffs on agricultural products. The tariff of approximately one-third the value of sugar benefits a few but the group as a whole loses. The tariffs over 40 cents per bushel on flax or on a pound of wool, benefit only a small minority of the total number of farmers. Perhaps this is sufficient to represent a net gain to the entire group. When the dairy farmers, sheep raisers, or flax producers want increased tariffs, it is not the welfare of the farmers as a class that they are considering, and much less the other classes in society. They desire gains for themselves. From a military point of view there may be some slight justification for protecting some of these products, especially wool, but even this argument is questionable in the case of flax and sugar. Tariff for revenue in case of sugar has little weight since present income taxes yield the government more money than it needs. From the standpoint of vested interests, there is good reason for continuing the present rates for some time.
but there is no reason for increasing them or even indefinitely continuing them because of past errors. To have tariffs on agricultural products because there are tariffs on manufactured commodities, is a good argument from a class point of view, but not from a social point of view. Two wrongs never make one right. It is a waste of effort to stimulate the production of goods which can be obtained cheaper from other countries. It would likewise be equally wasteful to stimulate greater production of those products which we now export. The proportions in which these products are now grown depends on the relative profitability of the various commodities. Any increase in the value of these commodities would surely be followed by expanded production. During the war, prices of wheat acreage increased about one-half. The prices were a little more than doubled in dollars, but the actual increase in purchasing power was only about 25 percent. The increase in purchasing power of other products was also considerable, so that the relative profitability of wheat over other crops was small. Wheat production increased in the corn belt even though corn rose 36 percent in purchasing power.

In Part II, it was pointed out that in the case of local crops a smaller quantity would yield larger net returns and in some cases greater gross returns. In the case of cotton, this was also true. In the case of wheat, our exports are a small part of the world supply; a larger crop brings more income. Wheat could only be substituted for cotton in some areas and even there on the average, it does not pay as well as cotton. About the only alternative for the cotton producers is to produce corn or nothing. To grow corn would greatly increase the corn acreage and the increase in returns
from cotton would be offset in the decreased returns from corn. Such a procedure undoubtedly would help to solve the problem of low incomes in the cotton belt by shifting it to the corn producers. To let part of the land lie idle would also increase the returns to the cotton producers and perhaps to the United States as a whole. Since we export over half of the cotton, most of the increased returns would come from consumers in foreign countries and as long as they would put up with higher prices, there would be a gain. Each farmer is free to plant as much as he pleases and his individual returns depend on the amount he can raise, therefore there is no chance that he will reduce his acreage of cotton as long as there is no other purpose for which he can use his land more profitably.

Summary and Conclusions to Part III.

If crops or animals are considered as a whole, there is no indication that there was any excessive expansion either in acreage, or in the number or volume of products throughout the war period. Likewise, there is no indication that there has been any excessive volume of products since the war, nor has there been any falling off in the percentage of the different products exported. Total volume of production has increased, although not as rapidly as population. Foreigners have taken about the same amount of our agricultural products as at other times. Some shifts took place between different commodities during and since the war, but there is no indication of any great maladjustment between the proportions of the various products. Per capita acreage is decreasing, but this cannot be said
to have any direct bearing on the agricultural problem. It is chiefly, the result of a growing population and a limited land supply. There is no sound evidence that yields per acre are decreasing greatly. If we use E. E. Day's index of physical production per agricultural laborer, the production has increased about 47 percent since 1880. This would indicate that there was increasing efficiency in agricultural production in this country. The relative increase in agricultural imports indicates both increased manufacturing in this country and a rising standard of living, and not a decay of domestic agriculture.

Viewed from a purely physical point of view, there is nothing to indicate that there is an abnormal quantity of physical goods that can be considered as a surplus. There is nothing to indicate that agriculture is degenerating or has been degenerating since the middle of the last century. The situation as far as physical plant and physical production is concerned, shows no cause for social alarm as is implied in the analysis made by the National Industrial Conference Board's Report on the Agricultural Problem. The decreasing importance of agriculture relative to industry is indicative of the continued change that has taken place since agriculture was the only industry. As long as this country can and does produce agricultural products sufficient to satisfy the domestic demands, this should be looked on as progress rather than as a calamity.

From the discussion of tariffs, it is apparent that they have not greatly changed the agriculture of this country, as far as tariffs on agricultural products are concerned. The effects of other tariffs on agricultural products will be discussed briefly in
the next section. It would be possible to reduce many of our imports and to some extent our exports by higher tariffs on products imported, but it would not be socially desirable. In cases where production varies from an import to an export basis, tariffs increase price fluctuations rather than act as a stabilizer of prices. If the agricultural depression is not due to physical quantities, then it must be a problem of prices and costs. The next section of the thesis will deal with this phase of the problem.
The concept of a general agricultural surplus is necessarily a relative term. It implies that incomes to the industry or the people engaged in it, are low. The income may be low relative to that in the past, or to that of other classes in society, or to some ideal of what constitutes fair returns. The previous analysis has shown that, there is a definite relation between the supply of an individual product and the returns from it. It has also been pointed out that for all agricultural products, there has been no increase in quantity, especially if measured relative to the population or to the percentage exported. If the income to Agriculture is low, there must have been a change in the price relationships between farm products and other commodities, or in the costs of producing farm products. This part of the thesis will analyze some of the available data to show the changes in prices, costs, incomes, and the causes for these changes.

Changes in Prices.

Several indices are available for measuring the changes in the general price level. The one most commonly used is the Bureau of Labor Statistics Wholesale Price index number. This is composed of 404 commodities divided into nine groups. Only one year, that of 1913 is used as a base period. Table IV shows this index number from 1902 to 1925 by groups of commodities.
|       | 1919 | 1920 | 1921 | 1922 | 1923 | 1924 | 1925 | 1926 | 1927 | 1928 | 1929 | 1930 | 1931 | 1932 | 1933 | 1934 |
|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Farm  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  |
| Prods. | 36   | 36   | 36   | 36   | 36   | 36   | 36   | 36   | 36   | 36   | 36   | 36   | 36   | 36   | 36   |
| Foods  | 77   | 77   | 77   | 77   | 77   | 77   | 77   | 77   | 77   | 77   | 77   | 77   | 77   | 77   | 77   |
| Light  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  |
| Prodts. | 82   | 82   | 82   | 82   | 82   | 82   | 82   | 82   | 82   | 82   | 82   | 82   | 82   | 82   | 82   |
| Chem.  | 96   | 96   | 96   | 96   | 96   | 96   | 96   | 96   | 96   | 96   | 96   | 96   | 96   | 96   | 96   |
| Building | 86   | 86   | 86   | 86   | 86   | 86   | 86   | 86   | 86   | 86   | 86   | 86   | 86   | 86   | 86   |
| Metal  | 77   | 77   | 77   | 77   | 77   | 77   | 77   | 77   | 77   | 77   | 77   | 77   | 77   | 77   | 77   |
| Fuel   | 79   | 79   | 79   | 79   | 79   | 79   | 79   | 79   | 79   | 79   | 79   | 79   | 79   | 79   | 79   |
| House  | 78   | 78   | 78   | 78   | 78   | 78   | 78   | 78   | 78   | 78   | 78   | 78   | 78   | 78   | 78   |
| Misc.  | 79   | 79   | 79   | 79   | 79   | 79   | 79   | 79   | 79   | 79   | 79   | 79   | 79   | 79   | 79   |
| ALL   | 80   | 80   | 80   | 80   | 80   | 80   | 80   | 80   | 80   | 80   | 80   | 80   | 80   | 80   | 80   |

**United States, 1909-1925.**

**Index Numbers of Wholesale Prices by Groups of Commodities.**

**Table IA.**
Price changes of the various groups of commodities are not identical, but are very similar, in that all rose during the war and declined in 1921. The prices of farm products neither rose as rapidly nor as high as that of some other groups, but they rose higher than the average of all the commodities. In 1921, they fell not only more than the average of all groups, but to a lower level than any other group. Between 1921 and 1925, the prices of farm products increased to such an extent that they are now practically equal to the average of all commodities.

Figure 48 shows graphically the All Commodity index and the farm products group since 1890. The rapid change in prices during and after the war, caused considerable disturbance. It is the chief cause of the present agricultural depression. The fact that the prices of farm products fell to a lower level than other products in 1921, and have remained lower is also a cause of the present condition of agriculture. This spread between the prices of farm products and other commodities is discussed in most discussions concerning the agricultural depression; but that the amount of this spread depends almost entirely on the base period, is often overlooked. On a 1913 base, agricultural prices were less than the average of all commodities at all times previous to 1910. Figure 48 only shows changes since 1890, but if the analysis is carried back to 1790* the spread is much greater. To make the base period an average of 1910 to 1914 has very little effect because agricultural prices and the general price level moved together in those years. When 1913

is used as the base period, agricultural prices have only been equal to, or greater than the general level of prices ten times, and all of these since 1909. If some date previous to 1909 is taken as the base period, agricultural prices are much higher than other prices up to 1921 and approximately equal to them since. Changing the base period would of course have no real effect on the agricultural situation, but it would show more accurately the change in conditions. To use 1913 as a base period tends to exaggerate the severity of the depression.

The Bureau of Labor Statistics index number is of wholesale prices and the group of farm products contains some commodities originating in other countries so that it is not an ideal measure of the prices of farm commodities produced in the United States. To overcome this difficulty, the United States Department of Agriculture has recalculated the index number, separating agricultural products from all other commodities with 1910 to 1914 as the base period. They have also constructed an index number of farm prices of 30 agricultural commodities with the same base. These index numbers are shown in Figure 49. The relationship between the two is usually spoken of as the purchasing power of the farmer's dollar. This is obtained by dividing the index number of farm prices by the one for non-agricultural products. Farmers do not buy at wholesale, but if retail margins have remained the same, it represents fairly well the relative per unit exchange value of agricultural products with other commodities. It is questionable if this base period can be considered normal, because the purchasing power of agricultural products has only been equal to or greater than it in 1918 and 1919. According to this index, the purchasing
Figure 84. Index Number of Wholesale Prices, Non-agricultural Commodities, 1910-1926.

power of the farmer's dollar was below par (1910 to 1914 average) in 1915, 1916, 1917 and 1920, in fact most of the war period, when even the farmers themselves will admit that farming was a profitable business. There are serious objections to taking too remote a base but 1910 to 1914 does not appear to accurately represent normal conditions. This will be discussed more fully later in connection with land values.

The spread since 1921 between agricultural prices and other prices appears greater in Figure 49 than in Figure 48. The all-commodity index in Figure 48 includes agricultural products which makes the average of all prices lower than the prices of non-agricultural commodities in Figure 49. Farm prices relative to the same base period are lower now than the wholesale prices. This may be partly due to changes in marketing costs other than transportation but is primarily due to the increased freight rates.

Figure 50 shows an index number of freight rates of agricultural commodities. It was fortunate for the farmers that freight rates lagged when prices increased, but rather disastrous that they reached the highest level when agricultural prices were lowest. Freight rates have remained high since 1921 and there appears to be no indication of any lower rates in the immediate future.

These index numbers of prices do not show the relative changes for individual products and space does not permit of such an analysis. The following quotation from the United States Department of Agriculture Bulletin no. 999, "Prices of Farm Products in the United States" by G. F. Warren shows that the drop in prices or purchasing power was quite general for all agricultural products.*

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* United States Department of Agriculture Bulletin no. 999, page 19.
Index of Farm Wages, Freight Rates, on Agricultural Products and Farm Prices.

Figure 50.

Source - U. S. D. A. Yearbook 1925, pp. 1405, 1374.
power on June 1, 1921 for farm products was as follows: corn 61, oats 60, barley 53, wheat 93, rye 101, buckwheat 101, flaxseed 55, beans 81, cotton 51, cottonseed 52, hay 68, cabbage 111, onions 73, potatoes 64, sweet potatoes 89, peanuts 48, apples 91, chickens 116, eggs 77, butter 83, milk cows 80, beef cattle 69, veal calves 73, sheep 66, lambs 79, wool 58, hogs 67, horses 45. Practically nothing that the farmer sells can be exchanged for the usual quantity of other things." Measured on the same basis the average purchasing power of farm products was 69 in 1921, 89 in 1925, and 85 in 1926.

Changes in Costs.

Changes in costs are as important as changes in prices. If they rose and fell exactly as much as prices, incomes would remain practically constant. It is necessary in discussing costs, to distinguish between costs to the individual operators and costs to the industry as a whole. The costs to the industry are wages, repairs, maintenance and supplies. The last item includes fertilizer, feed, oil, twin, etc. The minimum standard of living that the operators will accept rather than to move, can also be considered as an expense to the industry. Improvements are not a cost of producing the present supply, but are made because future prices are expected to be high enough to reward the investor. Land rent represents the difference between costs and value and is the income the industry as a whole receives. If farming only returned enough to the producers to pay the costs to the industry as a whole, agriculture would still be carried on but there would be no rent. The income from rent to the industry as a whole is often confused with costs. It may accrue to the operator
if he owns the land, or it may be transferred to some other person or 
the government in the form of cash rent, share rent, interest on mort-
gages or as taxes, but in every case, it is income to the industry and 
not a cost. Insofar as agriculture receives the benefits of the taxes 
it pays, they are not a cost.

Costs to the individual operators may be divided into oppor-
tunity costs and expenses. Opportunity costs represent what the farmer 
could earn elsewhere and other uses to which he could put his land, 
buildings and equipment. For any short period of time, these costs are 
practically nothing. Expenses to the farmer include mostly his cash 
outlays for operating the farm and for his family living. Both must 
be covered over a period of years, if he is to continue farming. For 
any short period of time, he may use up his capital or borrow to meet 
expenses. If he earns only a little more than the farm expenses, he 
may continue operating for a long time but is forced to reduce his 
standard of living. Maintenance, depreciation, and repairs are also 
costs to the individual but in many cases, they can be deferred for 
several years. In so doing, the farmer is really using up his capital 
to meet current expenses. If capital was invested in goods that will 
not be replaced in the future, then the wearing out of such equipment 
cannot be considered as a cost. Improvements as such are capital 
accumulations and not costs, but the expense of making improvements 
may be so high that they are not made and incomes are smaller in the 
future on this account.

Satisfactory data is not available for measuring accurately 
either the costs to the industry as a whole, or to the individual
operators. All that can be determined from the available data are some approximations of the changes. Of the total gross value of agricultural products in 1924 and 1925, about 40 percent were used within the industry and about 60 percent were exchanged for the goods and services of other persons or industries.* These percentages may change a little from year to year, but a considerable portion of agricultural products are used either directly in operating the farms or for family living. Changes in the prices of this part of the product have no effect on the costs to farmers as a group, but may cause a change in the distribution of income among the farmers. The expenditures outside the industry were divided approximately as shown in Table V.

Table V: Expenditures by Farm Operators in 1924-25.**

<table>
<thead>
<tr>
<th>Item</th>
<th>Percent of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food purchased</td>
<td>16.4</td>
</tr>
<tr>
<td>Machinery, equipment, buildings &amp; repairs</td>
<td>15.4</td>
</tr>
<tr>
<td>Clothing purchased</td>
<td>14.3</td>
</tr>
<tr>
<td>Sundries purchased</td>
<td>12.8</td>
</tr>
<tr>
<td>Wages of hired labor</td>
<td>12.3</td>
</tr>
<tr>
<td>Rent paid to non-operators</td>
<td>10.7</td>
</tr>
<tr>
<td>Interest paid to non-operators</td>
<td>7.7</td>
</tr>
<tr>
<td>Taxes paid by operators</td>
<td>6.3</td>
</tr>
<tr>
<td>Fertilizer bought</td>
<td>3.1</td>
</tr>
<tr>
<td>Fuel and light purchased</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>100.00</td>
</tr>
</tbody>
</table>

These estimates show approximately how the farm operators spent their money in 1924-25. They neither represent costs to the industry as a

---

** Ibid, page 103.
whole nor the costs of farming by the operators. The largest single item is food and that is clearly a living expense. The third largest item is clothing which is also a living expense, and no doubt part of the items: sundries, machinery, equipment, building, repairs, and fuel and light belong in this category. The common method of showing the relative welfare of the farmer in respect to these items purchased is to compare farm prices with wholesale prices of non-agricultural commodities as was shown in Figure 49. This exaggerates the conditions. The index number of prices of non-agricultural commodities is weighted according to the relative amounts produced and not according to what the farmers buy. A better comparison can be made from Table IV. Food prices lagged behind agricultural products when prices increased and decreased. The spread however was never very great. Clothing prices did not rise as rapidly but have remained much higher than those of farm products. Farm machinery and Equipment can be roughly compared to the group, Metals and Metal Products. These prices rose more rapidly than those of farm products, but have been lower since 1922. Building Material and House-furnishing Goods has been high compared to farm products, but it is doubtful if the farmers have been building many new buildings or buying much furniture. The purchasing power of the farmer's dollar as shown in Figure 49, represents more nearly what the farmer's dollar could buy than its exchange value in terms of what he does buy. This discussion indicates that the prices the farmers have to pay are not as high as generally believed. An argument can be made to show that such an index number minimizes the prices that farmers pay. They have to buy at retail prices which lag behind wholesale prices. There is no way of telling just how much
higher the prices of the things the farmers buy are, than in 1910 to 1914, but it is safe to say that they are higher.

According to Table V, wages paid to hired labor are approximately 12 percent of the cash outlay by farm operators. The changes in farm wages are shown in Figure 50. Wages did not rise as rapidly as farm prices, but rose higher and fell less. Since 1920 wages have been about 25 percent higher than prices on a 1910-14 base.

Taxes as shown in Table V do not include those paid by non-operating landowners. Therefore, this item appears lower than figures given sometimes to show the percentage of agricultural incomes taken by taxes. Total taxes on farm property increased from 315 million dollars in 1913 to 750 million in 1920 on the basis of calendar years, and from 596 million in 1919-20 to 891 million in 1924-25 on a crop year basis.* Taxes on farm property have been rising continuously. They did not decline with prices in 1921 and are now approximately 2½ times higher than farm prices as compared to the prewar level. Although taxes are an expense to operators, they are not necessarily costs that reduce the farmers real income or standard of living. The largest part of the taxes paid by farmers are for the support of local schools and roads.

Interest payments on borrowed capital represents a considerable item of expense to farm operators. The United States Census shows that farm mortgage indebtedness was 1,086 million dollars in 1890 and 1,726 millions in 1910, and 4003 millions in 1920. There was practically no increase between 1890 and 1910, but between 1910 and 1920, the increase was 232 percent. The ratio of debt to value was 27.3 in 1910 and 29.1

in 1920. Mortgages increased faster than dollar values of property. The amount of the mortgages remained high when prices fell in 1921. The results can be shown by the data for Minnesota.* The mortgage debt on January 1st 1920, was 254 million dollars on farms valued at 926 million, a ratio of debt to value of 27.5. On January 1st 1925, the debt was 264 million on farms valued at 612 million, a ratio of debt to value of 43.6. Farmers that had an equity of 72.5 percent in their property in 1920, lost ¼ of it so that their equity in 1925 was only 56.4 percent. Interest payments did not decrease with the price level, so they represent a greater burden to operators since 1921.

This type of analysis of prices and costs is commonly used to show the adverse conditions of agriculture since the war. No doubt costs per unit of goods and services bought have been higher since the war than the prices per unit of the product sold by the farmer but this is not a fair measure of the farmers' prosperity. To say that the purchasing power of the farmer's dollar is now only 82 cents proves nothing. The Ford Industry will serve as an illustration to show the weakness of this type of an analysis. Costs in terms of labor, taxes and commodities that Ford purchases are higher now than in 1913, when a Ford touring car sold for $550. In 1925, almost the same car sold for only $290. By using the all-commodity index number, it is possible to calculate the purchasing power of Ford's dollar. It is only 33 cents compared to the 1913 level. No one would say that this was any indication of the prosperity of the Ford industry, but many people interpret the purchasing power of the farmer's dollar of 82 cents calculated in the same way to indicate the relative incomes to farmers. There have been big economies in

* Preliminary Report of the 1925 Farm Census.
the production of automobiles through increased specialization and inventions, use of more machinery, and a larger output. These changes largely account for variation in the price of automobiles.

Any valid comparison between costs and prices must take account of the productivity of the cost elements so as to obtain some measure of cost per unit of product. If due allowance is made for the increased volume of products as well as the decreased number of farmers, the relative position of farmers is not as adverse as indicated by the purchasing power of the farmer's dollar. Changes have taken place that affect the cost per unit of agricultural products. The number of farms increased 87,000 from 1910 to 1920 and decreased 77,000 from 1920 to 1925. Production was approximately 10 percent greater on the same number of farms in 1925, as in 1910. Fewer horses and more machinery are used. A smaller number of dairy cattle produce as much or more dairy products. Acreage of alfalfa has increased considerably since 1910. Where this crop can be grown, it is far more efficient than many other crops both in use of land and labor in the production of animal food. It is estimated that the crop production per worker increased nearly one-fifth,* from 1910 - 1920. Changes in the volume of production and the number of farms indicate that this increase in productivity per worker has continued since 1920.

No satisfactory data is available for showing the costs per unit of producing agricultural products. Table VI taken from the National Industrial Conference Board Report on the Agricultural Problem * fails to put agricultural costs on a per unit of product basis.

* National Industrial Conference Board, "The Agricultural Problem in the United States"
Table VI: Index Numbers of Prices and Elements of Cost per Unit of Agricultural Products, 1879-1883 = 100.

<table>
<thead>
<tr>
<th>Period</th>
<th>Wholesale Prices of farm products</th>
<th>Capital charges</th>
<th>Labor costs</th>
<th>Material costs</th>
<th>Composite costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1879-83</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>1889-93</td>
<td>88</td>
<td>109</td>
<td>102</td>
<td>101</td>
<td>105</td>
</tr>
<tr>
<td>1899-03</td>
<td>92</td>
<td>105</td>
<td>95</td>
<td>104</td>
<td>99</td>
</tr>
<tr>
<td>1909-13</td>
<td>124</td>
<td>152</td>
<td>137</td>
<td>147</td>
<td>143</td>
</tr>
<tr>
<td>1919-23</td>
<td>214</td>
<td>403</td>
<td>207</td>
<td>238</td>
<td>262</td>
</tr>
</tbody>
</table>

This table appears to show that costs per unit of product have been greater than the selling price even since 1879-83. It is largely from this data that they arrived at the erroneous conclusions* that conditions have been adverse to agriculture since about 1880 and that increasing costs have led to the sacrifice of soil fertility. These data are included here because they are an excellent example of fallacious economics. The index of prices may or may not be correct, but no doubt it represents fairly accurately changes in the wholesale prices. The index of capital costs is based on interest at the prevailing rates on the operators' investments. In other words, it amounts to charging interest on land values as a cost per unit of product. It has been previously explained that land value depends on the present rate of earning power of land and on the future increases in the earning power. If this index of capital costs correctly represents the increases in values of land one must conclude that agriculture has been extremely profitable in the past, and that the other
indexes for labor and equipment costs are wrong. There can be no explanation of increasing land values over as long a period as 50 years other than that prices of the products from the land have been greater than the costs of producing these products. Since this difference has been increasing continuously, land must be contributing a larger share in the value of the product. This does not show that the soil has been depleted, but strongly suggests the opposite. The labor and equipment cost surely has not increased as rapidly in proportion to prices as is shown in this table. If it had, there could have been no increase in land values. It may be that the spread between wholesale prices and farm prices has been reduced enough since 1880 so that the changes in wholesale prices do not measure changes in the returns to farmers per unit of product. If this is true, then these indexes of labor and material costs may be correct, and although much higher now than in 1880 still leave profits from farming to be capitalized into land values. To combine capital costs with other costs to show the per unit cost is to confuse returns with costs. The composite index is high largely on account of the weight given to capital costs. If we take only the last period and weight labor costs six to material costs one, (approximate proportions) and leave out capital costs, the new composite costs are 211 as compared with the price of 214. This may be far from correct but surely is nearer correct than that of 232 shown in the above table.
Agricultural Incomes

Changes in prices and costs are significant only insofar as they affect incomes. Some of these relationships have already been discussed. The distinction between incomes to the industry as a whole, and to the individual operators must be kept clearly in mind in speaking of the returns to agriculture. The industry as a whole may be highly remunerative and yield a very large income, but that income may be divided so that the actual operators are virtually peasants. Persons other than the operators may receive a large part of the income in the form of rents or interest on mortgages. The government may take in the form of taxes so large a share of the income that the actual operators receive only a meager amount.

Rents and interest paid to non-operators reduce the income of the farmers but not that of the industry as a whole unless it causes inefficient operation. The increase in taxes has already been shown. Only part of the increase and not the total amount of the tax can be considered as reducing the farmers' incomes over a period of time. The amount of the tax as well as all expected increases are capitalized and subtracted from land values or rents. The owners of land at the time taxes are imposed or increased, pay all of the future taxes. Buyers of land deduct these taxes from the earning power of the land to arrive at the sale price. The advocates of a "Single Tax" would have the government take all of the rent as a tax, and land would have no sale value. Only a part of the land changes hands during a short period of time. The majority of the operators were the same in 1921 as in 1913. Therefore the increase
in taxes has tended to reduce both the capital value of their property and their incomes. The absolute amount of the tax also constitutes a greater burden because it remained the same when incomes tended to decrease, so that it becomes a larger percent of the total income. If taxes were collected from rents rather than levied on property values, they would vary with the income. The present system of property taxes may for any short period be a burden both to the industry as a whole and to the individual operators. Intangible property may be hidden or taxed at a lower rate so that land, and consequently all agriculture, pays more than its share.

The available data on farm tenancy does not indicate that tenancy is increasing so rapidly that operators are turning over more of the incomes to absentee landlards. In sections of the United States tenancy has increased greatly, especially if compared to very early conditions, but for the United States as a whole, it only increased from 35.3 percent in 1900 to 38.6 in 1925. Too large a percentage of tenancy may be socially undesirable but some tenancy may be beneficial. It is one of the steps in climbing the so-called "agricultural ladder".

Perhaps the best indication of the income to agriculture as an industry is the change in land values. Figure 51 shows average land value per acre in the United States by census periods since 1850. It also shows these values converted to an index with 1910 as the base. Average land values increased rather slowly from 1850 to 1890. They dropped a little from 1890 to 1900. From 1900 to 1910,

* A period during which immobility of the factors of production cause maladjustments in incomes.
land values doubled. From 1910 to 1920, land values increased 75 percent. The only considerable drop is between 1920 and 1925, when they dropped from $69.36 to $53.57 per acre. Changes in land values indicate that agriculture was receiving a larger and larger income from 1850 to 1920.* Part of the increase between 1910 and 1920 was due to the land boom but not all of it. The most rapid increase was between 1900 and 1910. Agriculture appears to have been very profitable by 1910, as compared to the earlier periods and is one reason the index numbers of prices and purchasing power of farm products on a 1910-14 or just a 1913 base show such adverse conditions since 1921. There is no logical reason for calling the price relationship between agricultural products and other products normal at that time, any more than calling them normal at the present time.

Free land of fair quality existed up to 1890 and considerable cheap, unused, fertile land remained up to 1900. By this time most of the good land was in farms and as prices increased, land values rose, partly because the net returns increased and partly because this increase was expected to continue. Land values did not keep up with price increases in the early part of the war period. They did increase more rapidly than was warranted in 1918 and 1919. This boom in land values was a great gain to those who sold, but a calamity for most of those who bought. There are no complete data available for the number of farms that changed hands. In Iowa,

* Agricultural incomes as indicated by the long time trend in purchasing power have increased since 1820. See Alvin H. Hansen, "Effect of Price Fluctuations on Agriculture", Journal of Political Economy April 1925.
65 percent of the purchasers were farmers while only 36 percent of the sellers were farmers.* Apparently other speculators were shrewder than the farmers and managed to unload the high priced land on prospective farmers. To agriculture as an industry, and to the owners who had farms in 1910, and kept them, this boom was only a book increase in value and resulted only in a book loss. Those who sold made a real gain, those who bought in many cases completely lost their life savings. Mortgages increased 2270 million dollars or 233 percent from 1910 to 1920, which means that a larger part of the decreased income since 1920 has been transferred to non-operators.

Land values in dollars did not increase as fast from 1910 to 1920 as the dollar fell in value, so that the value of land measured in actual purchasing power was less in 1920 than in 1910, and in 1925 was still below the 1913 level. Previous to 1910, purchasing power of land increased at about the same rate as actual dollars per acre. To a large extent, the changes in land values between 1910 and 1920, and 1920 and 1925, are due to the changes in the value of money and do not represent changes in income to the agricultural industry.

The Industrial Conference Board** in discussing in land values (and capital costs) makes the following statement: "This implied a rapidly increasing burden of capital costs for the industry as a whole, which was probably intensified by the increasing competition for capital which accompanied the expansion of industry and trade after the beginning of the century." Increasing

* Ivan Wright, "Farm Mortgage Financing", page 6.
competition for capital should increase interest rates if it has any effect at all, and higher interest rates mean lower land values. For example if net rent on land is $10 per acre, and there is no expected increase in rent at an interest rate of 5 percent, the value is $200, while at a rate of 10 percent the value is only $100. Although land values show to some extent the income to agriculture as an industry, they only indicate the returns to owner operators.

In discussing farmers' incomes, it is highly desirable to differentiate between money income and real income. Real income as used here means more than the purchasing power of the money income. The common usage of the term, real wages, simply money earnings expressed in terms of commodities or services. An index of money incomes divided by an index of the prices of the things bought, equals real income as the term is commonly used in reference to the welfare of the laboring class. Attempts to compare farmers' incomes in dollars to that of laborers have shown that in most cases laborers get the largest incomes. Returns to the farmers are a composite of the returns for his invested capital and his labor, and in most cases also the labor of his family.

Attempts to separate farmers' incomes into labor incomes and returns on investments are in no way satisfactory. If a fair rate of return is allowed on the investment, the returns for labor are very small. If the opposite process is used and some apparently reasonable figure is allowed for wages, the return on capital investment is low. Rents and land values have increased in the past so that, it appears that farmers have been willing to accept lower returns in terms of money for their labor than that obtained from
similar labor elsewhere. This does not necessarily mean that their real income has been less. Real income in the last analysis is psychic. Very few farmers would be content to live in an apartment house where they would not know the other people living under the same roof. Most farmers enjoy the social life of the country. No doubt, it can be greatly improved, but it is different from that of the city. Farming as an occupation, carries with it a type of independence not enjoyed by the laborer who perhaps works shorter hours but punches a clock both going and coming from work. The farmer may live in fear of low prices and small incomes, but he does not fear unemployment and complete loss of his income. Conditions in the country and in the city are so different in respect to the things that cannot be measured in dollars, that it is impossible to make a comparison of real incomes.

Agriculture has been a highly speculative industry. People have settled on new land and in many cases have taken a small present income each year. They have maintained a low standard of living, "hanging on", in the hope and expectation that land values would rise and their rewards would come. This cannot be considered as the business of farming, but rather speculation. This country has developed by such a process faster than it otherwise would. The farmers have acted as creditors for the nation as a whole, advancing cheap foods and raw materials, in the hope of future returns. This condition is also true of agriculture in many of the newer countries. How much real income or satisfaction the farmers have obtained from anticipating these future rewards cannot be measured in dollars. For those farmers who sold out and were able to collect the increased land values, this
income materialized into money. Those who are still "hanging on" have seen a large part of their expectations vanish. Beginning about 1914 with the fall in the value of money, land values decreased in real purchasing power, and many farmers after 1920 gave up hopes of ever getting any future rewards. They were unwilling to further reduce their standard of living or to remain as farmers at a low standard when they could better themselves by going to the cities. There is considerable inertia to moving, besides losing the efforts of their past labor, they are not sure that they can better themselves. Hence only a small percentage actually moves, but every one clamors for aid from the rest of society in order that they may remain in agriculture. In this way, they hope to actually reap in money, their speculative rewards.

Between 1920 and 1925, the total dollar value of farm property decreased from 79 billion to 59 billion, or a decrease of about 25 percent. This of course is not a real loss because, it was due only to the inability of people to forecast the future. Book values rose from 45 billion in 1913 to 79 billion in 1920 instead of only to 59 billion dollars. Farmers were not the only poor forecasters. Bankers and others loaned money on these fictitious values. In many cases, they lost but due to the legal nature of loans, the borrowers lost first and heaviest. The purchasers of high priced lands took the greatest loss, but their losses were the sellers' gains. From a social point of view, the change in money value of farm property, is neither a loss nor a gain.* This change in values caused considerable change in the

* It may have a slight effect on the productivity and be either a loss or a gain.
distribution, both of wealth and incomes between persons or groups of persons. Persons other than present operators receive more of the income from agriculture than formerly.

Any measure of the changes in incomes either to the industry as a whole or to individual operators, is too large a study to be attempted as a part of this thesis. Mr. A. G. Black is now writing a thesis on this subject.

Figure 52 taken from The Industrial Conference Board Report, shows to some extent the changes in farmers' incomes and incomes of laborers since 1914. No doubt this index exaggerates the conditions because of the manner in which it is calculated. The index of real wages makes no allowance for unemployment. It only shows the real wages of employed workers. Unemployment was very great in 1921 and 1922, and surely should be taken into account in showing real income of the laboring class. The index of farmers' real income is obtained by dividing an index of money incomes to farmers, by an index of their cost of living. The index of money incomes was obtained by subtracting the interest on the total investment (mostly land) at the going rates of interest, and by deducting the other expenses, if taxes, wages paid, and business expenses from the estimated gross income. Gross income includes a money value of food, fuel, and housing furnished by the farm. These items amount to more than half of the labor income per farmer when the interest on the investment is deducted. Since this index already makes allowance for most of the farmer's cost of living, it falsifies his real income to divide it by an index of the cost of living. The index of cost of living rose more slowly during the war and has fallen more slowly since
Trend of Average Annual Real Labor Earnings.
(Agriculture and Other Occupations, 1914-1925)
Index 1914 = 100.
the war. Dividing one index by the other, makes the farmers' real income appear too high during the war and too low since.

The chief weakness of this index is that the interest on the total investment is subtracted from the gross income. The same land and largely the same building are assumed to earn a greater share of the income at various times. Deducting an interest charge of 5 percent from 1909 to 1913, $5\frac{1}{2}$ percent in 1919, 6\frac{1}{2} percent in 1920 and $5\frac{1}{2}$ percent since 1920 on the value of property, reduces the real incomes to farmers by the amount of interest on the changes in land values. Land values as shown in Figure 51 are 35 percent higher in 1925 than in 1910. Subtracting interest on this extra value from gross returns makes the farmers' income appear smaller in 1925 than in 1914. On the basis on which the real income is figured in this index, land values did not drop suddenly in 1921, but were reduced gradually, so that when the real incomes are lowest in 1921, interest has been allowed on almost the full inflated value of land.

Table VII shows some of the actual data used in constructing Figure 52.

<table>
<thead>
<tr>
<th>Period</th>
<th>Farmers' Labor Income</th>
<th>Hired Farm Laborers without Board</th>
<th>Earnings of Workers in Other Occupations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1909</td>
<td>$376</td>
<td>$329</td>
<td>$596</td>
</tr>
<tr>
<td>1914</td>
<td>506</td>
<td>359</td>
<td>691</td>
</tr>
<tr>
<td>1919</td>
<td>1490</td>
<td>675</td>
<td>1285</td>
</tr>
<tr>
<td>1921</td>
<td>412</td>
<td>520</td>
<td>1356</td>
</tr>
<tr>
<td>1925</td>
<td>804</td>
<td>569</td>
<td>1415</td>
</tr>
</tbody>
</table>

The conclusion that the farmers are not receiving as big incomes as the workers in other industries cannot be drawn from these figures. All that they really show is that the farmers' incomes are not increasing as fast or as steadily, as workers in other occupations. The question of what values to put on food, fuel, and housing in order to make incomes in the country comparable to those in the cities, has not been solved. If the food, fuel, and shelter furnished by farms were included at city retail prices instead of at farm prices, the discrepancy might be the other way. It is impossible to make allowances in money terms also for better schools, churches, fresh air etc.

Figure 53* is calculated from the same data as used in construction of Figure 52. This shows the gross money value of the income to agriculture and the purchasing power of this income in terms of the 1913 dollar. This index may also be read as representing the gross income per farmer because, if the number of farmers is reduced to an index with 1913 as the base period, there is less than one per cent change up to 1925. Figure 53 shows that in terms of gross income the depression has not been as severe as many people think. It also indicates the effect of deducting the interest on the land values from farmers' incomes in Figure 52. Gross incomes were practically as large in 1921 as in 1913, but net incomes were a little smaller because persons other than operators received a larger share of the income.

The number of bankruptcies among farmers to some extent indicates the severity of the depression. These are shown in Table VIII.

* In both Figures 52 and 53, the estimates of incomes are on a calendar year basis, from 1913 to 1920 and on a crop year basis from 1919 to 1925. This explains the break in the lines.
Figure 53 - Annual Gross Income to Agriculture.
Index 1913 = 100.
Table VIII: Number of Bankruptcies per 1,000.*

<table>
<thead>
<tr>
<th>Year</th>
<th>Business Enterprises</th>
<th>Farming</th>
</tr>
</thead>
<tbody>
<tr>
<td>1910</td>
<td>7.3</td>
<td>.11</td>
</tr>
<tr>
<td>1915</td>
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<td>1924</td>
<td>9.0</td>
<td>1.23</td>
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Farming is so closely associated with home life that bankruptcy has been looked upon as a disgrace. Farmers are slow in learning that it may be easier to evade the burden of debts than to reduce the standard of living. All of the increase in farm bankruptcies do not indicate adverse conditions. From 1910 to 1915, bankruptcies doubled. This increase may show that farmers are adopting business methods. Part of the increase of nearly 1000 percent from 1919 to 1924, may be due to this reason, but most of it suggests that the farmers have not been receiving a large income.

Bank failures could also be cited as evidence of the severity of the agricultural depression. To some extent, they are both a cause and a result of conditions. Easy loans to farmers on inflated land value, in many cases on second mortgages, helped land values boom. Loans also helped farmers to raise their standard of living after it has once increased, and this makes conditions appear worse in comparison. The inability of farmers to pay their obligations, resulted in most of the bank failures in rural districts, and some of those in the large cities. These failures in turn increased the hardships of the

farmers. Many whose credit was still good, could not borrow, and those who had some savings, lost a large part of it.

All of these various indicators of prices, costs, and incomes, show that conditions have been adverse to agriculture since 1920 but they also show that, the severity of the depression is usually exaggerated. There is no way of exactly measuring the conditions and although measurements help in understanding the problem, they aid very little towards a solution.
Causes for the Changes That have Taken Place

The causes for these adverse conditions may be separated for convenience into three groups, (1) the changes in all prices, (2) the greater changes in agricultural prices and (3) the continued low level of farm prices.

The changes in the general price situation involve not only the multiplicity of forces operating on account of the war, but all of the phenomena which is summed up in the term "business cycles." It would be impossible to go into a complete discussion here of all the theories involving the causes of business cycles. Many treatises have been written on this subject. As far as the period from 1910 to 25 is concerned, the price changes are due partly to increased war demands and a cessation of these demands, but more especially to the changes in the volume of money. The price of wheat more than doubled in dollars but only increased about \( \frac{1}{4} \) in actual purchasing power. When prices are increasing, borrowers gain because they can pay back the loans with less goods and effort than at the time when the loans were made. When prices fall, the opposite is true. The borrowers have to pay back the same number of dollars but this is equivalent to more goods. The farmers increased their indebtedness during rising prices and rather good times for agriculture as was shown by the data on mortgage indebtedness. As a class, they had very little to do with the increase or decrease in the volume of money, but they are largely responsible for their own financial procedure. When farmers are prosperous, they usually buy more land, and to some extent increase their standard of living. Business enterprises in prosperous times, build up reserves
not only by increasing their own plant and business but by investing in other income property. This may be stocks and bonds of other corporations or government securities. Many concerns were able to pass over the period of depression by selling these securities. For example, the Firestone Tire Company had a reserve of $35,431,000 in 1919. In 1921 they made a net loss of $17,167,000. This was taken care of largely by reducing their surplus to $15,813,000.

The farmer who had invested his surplus by buying an equity in land, found that when land values decreased, his share was practically gone and the land belonged to the mortgage holder. The changes in the general price level between 1913 and 1921 is perhaps the main cause for most of the farmer's troubles.

The explanations offered most frequently for the greater drop in agricultural prices, is that farmers as a group cannot or do not curtail production during periods of depression while other industries do. Figure 54 shows an index of the physical volume of production in manufacturing and in Agriculture with 1919 as the base period. Agricultural production has continued to increase a little since 1919. Manufactured products decreased about 20 percent in 1920 and 1921, but by 1923 had regained the former level and by 1926, were relatively greater than those of agriculture. No doubt, this change in relative amounts of production accounts for a large part of the immediate price discrepancy during the

* Data obtained from Dean Stevenson, School of Business, Administration, University of Minnesota.
Figure 54.

Indexes of Physical Volume of Production in Agriculture and Manufacturing in the United States. (1919-20; 1926-27)

Index Calendar Year 1919 = 100.
Crop Years beginning July first.

- MARKETINGS OF AGRICULTURAL PRODUCTS
- PRODUCTION OF MANUFACTURED PRODUCTS

change in the general price level but it fails to account for the continued spread.

Some people confuse these price spreads with relative incomes. Agricultural prices were lower, but there were more products, so that returns did not fall much further than in manufacturing. In industry there was approximately 20 percent less products to sell at about 30 percent higher prices. The losses in industry were shared between the owners and the laborers. The laborers suffered from unemployment, while producers made fewer sales. The farmer being both owner and operator in agriculture, suffered the reduced income alone. If farmers had been able to reduce their volume of products by the same percentage as was done in manufacturing, the price spread between the two groups of commodities would have disappeared or been very small, but the relative incomes of both groups would have been about the same and no doubt both of them a little lower.

War demands for food and agricultural products, raised their price abnormally as compared to the pre-war years of 1910-14. Fear of food shortage faced European countries a year or more after the Armistice. Government hoardings of foods were dumped on the markets in 1920 and 1921, and helped to reduce prices.*

Many have attributed the greater drop in agricultural prices to the falling off of exports. This idea is not borne out by the facts. In Part III data for exports of particular commodities were expressed as a percent of the total production, and expressed in that way showed no decline of exports since the war. If exports of all grains in bushels and of beef and pork in pounds are expressed as the

index numbers with 1913 as 100, the results are the same. The index of grain exports was 222 in 1921. The highest point during the war was 173 in 1919. The index of beef and pork exports was 160 in 1921, which is the same as in 1916 but less than in 1918 and 1919 when it rose to 263.* Other countries took the same amount or even a little more of our agricultural products at lower prices. Perhaps the lower prices were necessary in order to permit such large exports.

Agricultural products fall largely into the class of raw materials and fluctuations in prices of raw materials are usually greater than those of semi-manufactured or finished goods. "The change in the price of copper was similar to the change in the price of cereals, although the industry is highly organized so that production was curtailed and accumulated stocks fed on the market." **

The disappearance of war demands and some real decrease in demand on account of the large amount of unemployment in 1921, are no doubt the main causes for the greater drop in agricultural prices. The pre-war years of 1910-14 cannot be taken as normal. They represent rather an unusually high price for agricultural products. There is no fixed permanent relationship between prices of various commodities. The classical theory of economics only maintains that in the long run, agricultural prices will rise relatively to other prices. This has taken place, but the rise from 1890 to 1910 was perhaps faster than the long time conditions would warrant. Therefore by taking 1910-14 as a base period to represent normal times, conditions during the war and since appeared abnormal. The rapid recovery of agricultural prices from 1922 to 1925, tends to show that they were abnormally low in 1921. The failure

** Ibid, page 212.
of agricultural prices to regain the level of 1910-14 in respect to other commodities indicates that this period was abnormal in respect to long-time tendency.

The same factors that caused prices to drop in 1921, have to some extent been responsible for the continued low prices of agricultural products. The fact that farm prices have been relatively lower than wholesale prices of agricultural products has been partly accounted for in connection with the changes in freight rates. Other marketing costs account for the rest of the difference in the amount of the spread shown in Figure 49 as compared to Figure 48. The following discussion will analyze the reasons usually given for the continued spread between the wholesale prices of farm products, and the wholesale prices of other commodities.

High wages have often been credited with causing high prices. Broadly speaking, wages and prices are related but the cause and effect relationships are not simple. Over a long period of time, wages may increase, while prices decrease. Most farmers believe that the high wages paid to workers in other industries are one of the causes for the relatively high prices for non-agricultural commodities.

Figure 55 shows an index number of real and money wages. Money wages for the two separated industries, manufacturing and transportation, show that the changes are very similar to those of all groups. Money wages rose almost as fast as the price level, and did not fall as fast or as far. Money wages in 1924 were over 200 percent higher than in 1914. The index of real wages is obtained by dividing that of money wages by one of the costs of living. This index shows that real wages were 24 percent higher in 1924 than in 1913. These
Figure 55.

Index Numbers of Wages. 1914 = 100 for Manufacturing, Transportation, and all Groups.

index numbers do not take account of unemployment, and are therefore not exactly correct. Unemployment does not increase prices of manufactured goods but tends to reduce prices of farm products. Part of the increase in wages is undoubtedly due to the restriction of immigration and part of it may be due to the organizations among the laboring classes. Restricted immigration has an effect on agriculture aside from its effect on wages in that it keeps the total population from increasing as fast as if unlimited immigration were allowed. This does not reduce prices of farm products but keeps them from increasing as fast as they otherwise would.

A comparison of Figure 55 with Figure 49 shows that prices of non-agricultural products have tended downward since 1921, while wages have increased. This tends to show that, the higher wages are not causing higher prices. Of course there is no way of measuring how much lower these prices would have been, if wages had also been lower. It cannot be denied that there is some relation between high wages and high prices, but it is doubtful if as much of this increase in wages comes from the prices that the farmers pay as is commonly supposed. High wages per day or period of time do not always mean high wage rates per unit of product. When manufacturers are confronted with higher costs, they bend every effort towards increased efficiency. Railroads run longer trains with the same size crew, or the same trains with smaller crews. Manufacturers use more machinery and invent labor-saving devices.

Figure 56 shows the increases in output per laborer in several industries. There was very little increase in most cases from 1914–1919. But since 1919 and especially since 1921, the increase in
Index Numbers of Productivity of Labor. 1914 = 100, except for Railroads, 1890 = 100.

productivity per man has been approximately equal to the increased wages. Therefore it appears that the increased wages have come primarily from increased efficiency and not from higher prices. If it were possible to get this increased efficiency without higher wages, prices might be lower. It is impossible to measure the extent to which high wages are a cause or a result of increased efficiency. It is likewise impossible to tell how much effect these high wages have on prices. It appears to be only a minor factor.

The question may be asked if increased efficiency tends to raise wages in other industries, why does not it do likewise in agriculture? It has been pointed out that there has been considerable increase in the productivity per worker in agriculture. Returns to agriculture are a composite of returns from labor and returns from land in the form of rent. The increased efficiency which results in more product from the same land and labor, without a corresponding increase in demand, results in lower prices for the product and a demand for less land, with the result, that rents decrease and some land goes out of use. Such improvements should give farmers higher labor returns and lower rent returns. Farmers as a class apparently capitalize all incomes above a small wage into land values so that when increased efficiency results in the same amount of the product from the same amount of land; but with less labor, land values increase instead of the returns to labor.

The tariff policy of the United States is often blamed for causing the spread in price between agricultural and non-agricultural products. Farmers sell their products in the world market and buy goods in the protected home market. Protection for manufactured goods in the United States began over 100 years ago. During this entire period, this
system has always tended to make returns to agriculture less than they would have been at any particular time if the protective policy had been removed. Low incomes did not prevent agriculture from expanding. No contraction in total acreage took place till after 1920. If the tariff policy has tended to keep incomes in agriculture low it must have had the effect of preventing agriculture from expanding as fast relatively to industry as it otherwise would have done. Those who claim that agriculture is now over-expanded ought to credit the tariff policy with the fact that it is not still more over-expanded.

The amount of the tariff over a long period of time is not significant from the farmer's point of view. Land values and incomes, tend to become adjusted to the conditions. Industries of various kinds may be started to producing goods that would not have been produced or not in the present quantity. Some particular industry or small group of producers may benefit at the expense of the rest of society, but not all classes, other than the agricultural class, at the expense of the agricultural class. As long as more farmers keep entering the field of agriculture in spite of the disadvantage due to the tariff policy, surely still more would have entered the field if incomes had been higher. For society as a whole, a tariff policy may make all incomes lower than they otherwise would be. It directs effort into lines or fields of production, where this effort produces less product than could be bought from other sources.

The aspects of the tariff problem that affect farmers' incomes are the changes rather than the absolute amounts. If as soon as agriculture becomes adjusted to one tariff rate or nearly adjusted to it, the rate is changed, then there is continuous maladjustment between
agriculture and industry. There is no satisfactory way of measuring
exactly or even approximately the effect of tariff on agricultural
incomes. It is easy to show that the total amount of revenue received
from tariffs on manufactured goods as compared with that from agri-
cultural products is no indication of the effects one way or the other.
This type of comparison was given in a speech by President Coolidge
in Chicago in 1925. Very high duties on manufactured goods may be so
effective that there are few or no imports and the revenue is very
small, while a low duty on sugar may bring a large amount of revenue.

The people who say that the spread in prices during the
last depression is caused by the changes in the tariff are apparently
wrong. Table IX shows the Bureau of Labor Statistics Wholesale Price
Index of Farm Products and of All Commodities by Months from March
1920 to December 1922. There was practically no change in the tariffs
from 1913 to 1921. When prices declined agriculture prices fell faster.
The greatest spread occurred in April 1921, one month before the
emergency tariff act was passed. The low point for all prices was
reached in January 1922. From April 1921 to February 1922, the spread
became less, but as all prices increased a little in 1922, the spread
became greater up to October 1922, when the last tariff act was passed.

If one wanted to draw conclusions from this data that can not be sub-
stantiated by logic, he might conclude that these two tariff acts
helped the farmers because immediately after both tariff acts, the
spread decreased. There are too many other factors entering the prob-
lem to justify any such conclusion, but it is illogical to blame the
tariff changes for spreads between prices that occurred before the
changes in the tariff were made.
<table>
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<th>Year by Months</th>
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<th>All Commodity</th>
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<td>232</td>
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<td>Aug.</td>
<td>218</td>
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<td>Oct.</td>
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<td>Dec.</td>
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Some comparison of the effects of tariffs can be indicated by a comparison of changes of prices in Canada with those in the United States. It is commonly recognized that tariff rates in Canada, are lower than those in the United States. The estimated average duty on dutiable imports in Canada in 1924, was 22.9 percent* while those in the United States were 37.39 percent.** These figures are not exactly comparable but roughly indicate the difference.

Figure 57 shows all-commodity index numbers of wholesale prices in the United States and in Canada, also an index number of wholesale prices of farm products originating in Canada and in the United States. The general price movements in the two countries are almost identical. Wheat is more important in Canada than in the United States and accounts to some extent for the higher rise during the war and the somewhat slower drop following it. When the index of agricultural prices is divided by the all-commodity index, a measure of the relative purchasing power of agricultural products is obtained. The purchasing power of Canadian farm products rose higher than in the United States, but also fell lower. This cannot be attributed to the lower tariff because it could hardly have effects in both directions. As stated previously, the price relations between agricultural products and other products would have been different at any one time, if there had been no tariffs; but regardless of the pre-war conditions, it appears as if there would have been a spread in prices after the war even if the United States were a free trade country.

The tariff policies of other countries have some effect on

* Canadian Year Book 1924, page 383.
** Statistical Abstract of the United States.
Figure 57—Index Numbers of Wholesale Prices of all Commodities of Farm Origin in United States and Canada.

agricultural prices in the United States. Canada attributes part of the decrease in prices in 1923 as shown in Figure 57, to our tariff act of 1922. This act affected prices of the best grades of wheat and also of beef, pork and a few other farm products in Canada. The extent to which this is true cannot be measured. European countries are trying to make themselves more self-sufficient in food products. Other new countries, Australia, and Argentina, have been expanding production. Russia is returning to a pre-war output of food products. All of these help to make food prices lower than during the war period.

Perhaps the most significant reason for continued low prices, is the decrease in consumption requirements, not only per capita, but also for the total requirements for animal food. The most outstanding change in demand is that brought about by the decrease in the number of horses on farms. On January 1st 1920, there were 19,845,000 horses on farms, and 5,470,000 mules. On January 1st 1927, there were only 12,279,000 horses and 5,734,000 mules.* Considering both horses and mules, this is a decrease of 7,311,000 head or 28.9 percent. In addition to this, all cattle decreased from 68,835,000 to 57,521,000 or 10,314,000 during the same period. Swine increased 10,376 from 1920 to 1923, and then decreased 15,653,000 to a lower level in 1927. Sheep decreased 2,696,000 from 1920 to 1922 and then increased 5,580,000 to 1927. Allowing 4 acres as the amount of land required to feed one horse and only two acres for each head of cattle, this decrease in numbers of animals is equivalent to 50,000,000 acres of crop land. These estimates of acreage required per head may be a little high, but the decrease of horses in cities for which there are no recent figures tends to offset it. If only one acre per head

* Agricultural Situation, February 1927.
of cattle is allowed, the decrease would still be equivalent to 
40,000,000 acres. There were 350,000,000 acres of crop land in 1920. 
Of this total, 104,600,000 were in corn, 73,100,000 in hay, 57,200,000
in wheat, 43,300,000 in oats, 36,400,000 in cotton and 36,000,000
acres in all other crops.* If the decrease in number of animals is 
expressed as acreage equivalents, it is equal to almost half of the
corn acreage, or about half of the hay acreage, or almost the entire
wheat acreage, or a little more than the acreage of oats or cotton
and greater than all land used for minor crops.

A few farmers may gain by using gasoline power to produce
horse feed, but when a great number of farmers try the same process,
it results in an abundance of horse feed and very few horses to eat
it. Therefore it takes more bushels of product to purchase mechanici-
al power. Perhaps from a social point of view, production of human
food can be accomplished with less effort by farming fewer acres with
power pumped out of the ground, than by raising feed for numerous
animals that are only an aid in the process of procuring human food.
But as far as the farmers alone are concerned, it is a transfer of
demand from farm products to the products of the iron, steel, and
petroleum industries. Prices of farm products are less and those of
other products greater. Perhaps the farmer's psychic income is greater
even if his money income is less. He may derive more pleasure from
greater speed of mechanical power as well as avoiding part of the
drudgery of doing chores. Since it only takes about one acre of crop
land to produce directly the food required by one person, the population
can increase about 40,000,000 before it presses as hard on the food.

* United States Department of Agriculture Year Book 1920, page 830.
supply as it did in 1920.

Per capita consumption of foods change rather slowly. Changes are of two kinds, shifts from one kind of food to another, or changes in the total amount of food eaten. Mr. Holbrook Working has made a study of the changes in the per capita consumption of foods.* He found from available data that there has been a considerable decrease in the consumption of flour and corn meal, considerable increase in the consumption of sugar, some increase in the consumption of dairy products and not much of a change in lard and meats. Per capita consumption of flour decreased 10 percent between 1904 and 1919, and 12 percent from 1919 to 1923. Expressed as bushels of wheat per capita, the consumption was 5.38 in 1904, 4.70 in 1919 and 4.20 in 1923. Per capita consumption of corn meal decreased from .597 barrels in 1889 to .13 barrels in 1921. Corn meal was used largely in the Southern States and it has been largely replaced by wheat flour. In other sections of the country, wheat flour has been replaced by sugar.

Consumption of sugar has increased rather steadily. In 1889 it averaged 50 pounds per person, in 1920, 100, and in 1925, 113 pounds per capita.

Mr. Working cites the following reasons for the apparent decrease in the total amount of food needed per capita. Less food is wasted, both in the process of manufacturing and in the home. The amount of manual labor requiring physical exertion has been reduced by the use of machinery and a smaller percentage of the total number of people work out of doors. Homes and other buildings are perhaps only a little warmer but more evenly heated than several years ago.

* Wheat Studies, Volume II, no.8, July 1926.
There is also perhaps some change in the average body weight of persons toward smaller weights. All these conditions reduce the food requirements and in addition, there seems to be considerable shift from the more staple foods to fancier or choicer foods.

Changes other than in foods such as styles of clothing have an effect on agricultural products. Few high-topped shoes are worn now. Low shoes require only a little more than half as much leather. Less clothing is worn and it takes less cloth to make the clothing. Silk is worn in place of cotton, and although silk is not produced from silk worms in this country, there is a shifting of demand from the staple product cotton to the silk from foreign countries. A large part of the silk used is made artificially from cotton and some from other products especially wood.

Another reason which cannot be measured statistically may be given for the changes and spreads in prices. In part II of this thesis, the relation between quantity and price of several crops was shown. The relationship expressed is only the dependent relationship between a variation in quantity and a variation in price. There may be factors affecting prices or quantities, which are entirely independent of one another. A new trend was drawn for corn prices since 1920. The relation of price to world supply of wheat was based on similar statistical methods. The deviations from these new trends apparently have the same relations as deviations from the old trends. The average relationship between prices and quantities of potatoes is also slightly different when unusual conditions prevail. An extremely short crop has different relationships than those forecasted from the price forecasting formulas. Most statisticians
leave out the war years in trying to determine the factors that affect prices, because either there appears to be some new factor operating, or the old factors have different cause and effect relationships. Even during what appears to be normal times, the relationships cannot be definitely measured. Correlation coefficients of one are seldom obtained. A few approach one, but many high coefficients are the results of questionable statistical methods. Changes in supply, the value of money, and several other factors may explain most of the changes in prices, but rarely all of the changes. The price of late potatoes can be forecasted more accurately if the August price of early potatoes is known. What were the causes of the earlier price? Part of the price level of a particular product or group of products depends on an immeasurable something. Since there is no name or expression that describes this something or complexities of many immeasurable things, it may be designated as the psychological attitude of the people. It is not possible to explain completely on materialistic grounds, such phenomena as price changes which are influenced to some extent by human beings. The following quotations take from an article* by Mr. H. S. Jennings a prominent biological scientist help to illustrate this point.

"Thought, purpose, ideals, conscience do alter what happens. **** It is not strictly true that popular approval or disapproval will not alter the course of nature.**** The desires and aspirations of humanity are determiners in the operation of the Universe on the same footing with physical determiners."

During the war either by false or true propaganda, people were led to believe that food was scarce, that "food will win the war". Agricultural prices rose in most cases more than can be explained in mathematical terms by applying measurements to various forces equal to

their usual effect. Since the depression, farm papers, newspapers, magazines and publicity of all kinds have informed the public that there is a "surplus" of farm products and that the prices are abnormally low. Why should anyone pay high prices for goods under such conditions? The same quantities as before bring lower prices. Foreign countries take about the same percentage of our products at a lower price. Why pay any more? The buying public is influenced to some extent by such information. It is impossible to measure how much. It may account for 5, 10 or even 50 percent of the spread between agricultural prices and other prices. There is some truth in the slogan, "It pays to advertise". If it works one way, why not both ways so that adverse advertising brings adverse results!

Summary

Prices and incomes have been low since 1920. They are usually made to appear lower than they really were by the use of a rather abnormal period as a base for comparison. This base period was followed by the extremely abnormal conditions of war demands for agricultural products. Changes have taken place in the technique of production so that fewer farmers and less land produce a greater supply of products. These changes in technique have also removed the demand for the products of nearly 10 percent of the land, by decreasing the number of animals. At the same time, the per capita consumption of agricultural products has decreased almost enough to offset the increase in population. Perhaps Mr. E. G. Norse is correct in his contention that the future outlook for agriculture is one of continued low prices and
incomes for some time.* It has been shown that wages and tariffs have very little to do with the present problem; that the change in general price level is one of the major causes of the farmers' problem. This led to inflated values and increased debts. Deflation necessarily came on account of inflation, and may be used as a catch-all for the numerous contributing causes. Undoubtedly this is what Mr. G. F. Warren means when he attributed the depression to deflation.**

There are so many people engaged in the speculative occupation of farming that they are not able to make as high returns on the speculative values of land as are made on values justified by earnings in other industries. Neither are they able to maintain as high a standard of living as they did from 1910 to 1919, because incomes are smaller, and a larger part of these incomes are taken by expenses. Even if the incomes are not absolutely less than they were 1910-1919, they are relatively less, as compared to other classes in society. The absolute amount of the income is not significant. If all others were worse off than the present farmers then the farmers would be more content.

Other industries have organized and formed combinations, improved marketing, and created a demand for their products. In some cases, they have carried out the questionable policy of dumping,—selling for less in foreign countries than at home. Farmers have been making slow progress at forming organizations. They cannot create a greater demand for all agricultural products. They have robbed themselves of a large part of the demand for their products and would like to have the government engage in the process of dumping for them.

*"The Outlook for Agriculture", Journal of Farm Economics, January 1927, pp. 21-33.
** Ibid, page 36.
Farming is speculation in two respects, first because weather causes wide variations in quantities and prices from year to year, and second because there appears to be a future time coming when population will press on the food supply and landowners will benefit. Early economists believed this would happen before the present time. Farmers think that increased population will raise land values in the near future. No doubt this will happen if increased standards of living are not effective enough to keep population from increasing faster than improvements in technique in agriculture. Since the war, increased production and decreased consumption have pushed the fear of food shortage further into the background.

The real surplus problem if it can be called by that name, is that there are too many farmers at present in respect to past land values and present incomes from agriculture. Some equitable system of reducing the number, by removing those from the marginal lands and revaluing the remaining property so that those remaining will make as high a standard of living as other groups in society, is needed. The slow sure method of letting economic forces make adjustments has been taking place. The total number of farms have decreased about one-fourth. This method often goes too far. Too many leave and a reaction takes place which causes the same problem to occur again. It also causes hardships on those who happen to be the victims. Society has always found means of improving or modifying the ways of nature to its own
advantage. The next part of this thesis will discuss a few of the remedies applied by other countries in somewhat similar cases, and how the proposed remedies in this country would help the present situation and prevent it from recurring.
PART V

CONTROL MEASURES.

The first half of this part of the thesis will be devoted to a brief description of a few of the numerous attempts by foreign countries to control the production and price of agricultural commodities. Plans for farm relief in the United States will be discussed in the second half. All tariffs, duties, bounties and restrictions of all kinds are attempts to modify directly or indirectly the production or price of agricultural products. Such control has been common since Bible times. The United States Department of Agriculture has published a bibliography of 127 pages on "Government Control of Exports and Imports in Foreign Countries". Discussion in this thesis must be limited to a few of these attempts having some resemblance to the measures advocated for farm relief in the United States since 1921. In every case described, the resemblance is slight but it helps to give an understanding of the possible effects of such legislation as the McNary Bill.

English Corn Laws.

Mr. R. C. Noyes, the sponsor of one plan for farm relief, defended the plan as being "economically sound". He defined this, "as anything that accomplishes what it is intended to do", citing the English Corn Laws as a case to prove his point.** It is impossible

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*United States Department of Agriculture Bibliography no.12.
** Address given to a Seminar Class at University Farm, St. Paul, Minnesota, Winter Quarter 1926.
to measure exactly how much benefit or harm was wrought by the English corn laws. Whether or not a thing is economically sound, must be judged from the standpoint of the groups welfare. Any tariff may accomplish its purpose of raising prices by cutting down imports but even then, it may be wholly unsound economically speaking. The whole series of laws known as the English Corn Laws cover such a long period of time and such a wide variety of conditions that there is little resemblance to the present problem.

England is a small country and does not have a wide range in climate. Weather conditions cause some variation in yields between places within the country, but usually a low yield is general over the entire country. Local crop failures caused local hardships before transportation facilities were developed. Taking the country as a whole, England varied from an export basis to that of scarcity, approaching famine, during the entire time covered by the series of acts known as the Corn Laws. In the United States, present conditions are not similar to this. Here there is a wide range in climate. Every year even in cases of the smallest crops, there is no fear of famine, and part of the supply is exported.

Various writers divide the period from 1361 to 1846 when these Corn Laws were passed into from 3 to 10 periods. As far as comparison with the present problem is concerned, it is possible to divide it roughly into only two periods. The first period was from 1361 to 1463. During this time, the main purpose of the acts was to protect the consumers by assuring them a supply of grain through the prohibition or limitation of exports. The second period was from 1463 to 1846 and involved the additional purpose of protecting
the producers.

In 1361 exportation of corn was prohibited by statute. In 1393, exportation of grain was permitted under license. In 1436, exportation was permitted without license, if the price per quarter was as low as 6 s. 8 d. at the port of exportation. These acts discouraged production by tending to keep prices lower than they would have been if exports had been permitted.

In 1463, importation of wheat was prohibited unless the price exceeded 6 s. 8 d. at the port of importation. From 1463 to 1689, there were numerous acts which principally changed the price limit under which importation or exportation could take place. By 1624, the price limit for exports had increased to 32 s. In 1670, exporting was allowed without any price limit. During this period, there were few imports, and the duties were suspended even on the mere threat of a scarcity. Thus, import duties as protection for the producers were practically inoperative.

In 1689, an act was passed which provided for a bounty on exports whenever the price fell below 48 s. per quarter. The purpose of this act was primarily to encourage production. Along with this bounty system was applied sliding scales of duties both on exports and imports. Imports were practically prohibited below a certain price and exports prohibited above a certain price. Changes in the base prices as well as in the rates of duty were frequent and in some cases duties were suspended entirely. In 1773, exports were permitted below 44 s. per quarter, and imports at a nominal duty of 6 d. per quarter, if the price was above 48 s. In 1791, the limit for import at a nominal duty was raised to 54 s. If the price was
between 50 and 54 s., the duty was 2 s. 6 d. If the price was below 50 s, the duty was prohibitive 24 s. 3 d. Beginning about 1788, imports began to permanently exceed exports. In 1815, the price limit for importations at a low duty was 69 s. 1 l/8 d. per quarter from the colonies and about 86 s and 6 d from other countries.

Between 1828 and 1839, corn price averaged 57 s 8 d. These high prices to consumers along with other objections led to the first serious attack on the Corn Laws in Parliament in 1839. In March 1839, the Corn Law League was formed by Manchester Merchants. They wanted cheaper food for their employees. This League conducted lectures, open air meetings, and circulated literature against the Corn Laws. In 1845-46, the potato failure in Ireland gave the League a new basis for an attack against taxes on foods. In 1846, a bill introduced by Sir Robert Peel was passed which suspended the corn laws for 13 months. After this, a lower scale of duties was imposed which lasted up to 1849, when all import duties were replaced by a 1 s. registration tax. This tax was also abolished in 1869.

It is impossible to tell just what effect these Corn Laws had on either production or prices. Writers on the subject do not agree. Available statistics for the period do not offer any proofs one way or the other. The removal of the Corn Laws apparently caused no immediate change. There were no great exporting countries from which to draw an immediate supply. The price was approximately the same for the next two years. Following this 1849-53 period, there were four good harvests in England and the price averaged 43s 71/5 d. But the average price from 1845 to 1873 was 53 s 2 d or
only a little lower than before the acts were repealed. After 1870, the price fell, due to the imports from America but this price decline came long after the Corn Laws had ceased to operate.

So far these Corn Laws have been stated as applying only to exports and imports. There were also numerous provisions in these laws that applied to what some people would call orderly marketing. In the interest of the poor people, farmers were compelled to sell to them first and at low prices. Dealers were regulated and even prohibited from buying at one price and selling at another in the same market. As late as 1800, a corn dealer was indicted for regrading—that is selling corn on the same day at an advance in price. Under that system, dealers could not perform the functions that they do at present, to operate a continuous market and store from one season to the next. Farmers were compelled to do this for themselves or other agencies had to be established. Towns and cities were of necessity compelled to erect public granaries and buy up a supply of grain and store it. Other laws attempted to regulate the price or size of a loaf of bread in relation to the price of grain.

Adam Smith does not have anything favorable to say for the Corn Laws. He criticized severely both the regulations concerning marketing and the system of bounties.

The conditions existing during the period that attempts were made to regulate production or prices by the Corn Laws, were entirely different than those existing at present. Their problem was one of avoiding or overcoming periods of scarcity. The present problem is not one of scarcity but to use the popular term one of a "surplus". The only resemblance between those acts and the ones

* Adam Smith, "Wealth of Nations", 1776, Book IV, Chapter V.
proposed as solution for the present problem is that in certain cases, bounties were paid for exporting in the years of plenty. This was done not only to maintain a more uniform price but to encourage production so that there would be a sufficient supply in years of low yields. Advocators of legislation in the United States hold the opposite view and say that bounties on exports would not increase production. Since statistics for this period are so meager that it is impossible to show the exact effects of the Corn Laws upon prices or production, it is impossible to draw any conclusions as to their effects. But it is safe to say, that the system of regulation necessitated numerous changes, and that after a period of 500 years of operation, it was abandoned and has not been re-enacted.

German Sugar Bounty.

"There has seldom been a chapter of political economy so instructive as that on German protection of sugar. It seems as if the government had tried to prove how much injury can be done to the most vital interests of a nation without making itself felt for a long while." *

The presence of sugar in beets was first discovered by Margrave in 1747, but so little use was made of the knowledge that fifty years elapsed (1801) before the first beet sugar factory in the world was established in Silesia.** Sugar was more of a luxury than at present and was taxed as one of the main sources of revenue for the German State. With the introduction of sugar beets, the import duty on cane sugar was fixed at fifteen marks per hundred weight, while the tax was fixed at eight pfennigs per hundred weight of beets. Since at that time, it required about ten to ten and one-half hundredweight of beets to produce one hundredweight of sugar,

the tax was only about 8.4 marks as compared to the import duty of 15 marks. This left a net protection of 6.6 marks per hundred-weight of beets to be divided between the farmers and the manufacturers. This was an immense stimulus to production and Germany was soon on an export basis. In order to encourage rather than to hinder exports, a drawback or refund of the tax paid was allowed on all sugar exported.

The drawback was at first calculated on the assumption that it required twelve pounds of beets to make one pound of sugar. While in fact the quantity of beets required fell in the course of time to ten, nine and later to eight pounds. This change in the amount of beets required to make one pound of sugar, came about through improvements in varieties of beets, and the mechanical and chemical methods of extracting the sugar.

Numerous attempts were made to correct the relation between the tax and the drawback but they were always a little behind the changes in technique. Insofar as more was allowed in drawbacks than was paid in taxes, there was an indirect bounty paid for the export of sugar. As a result of this system between 1880-1890, more than half of the total sugar produced was exported and the treasury lost through the payment of the drawbacks the greater part of the sugar tax receipts.

In addition to these indirect bounties, direct bounties were paid. In 1883, the direct bounty was approximately 14 cents per hundred pounds of raw sugar and proportionally more on refined sugar. In 1896, these bounties were approximately doubled. The
effect of both the direct and indirect bounties was to increase production and exports. The gains went into the pockets of the manufacturers rather than to the farmers.

"In spite of considerable writings off they have for years declared dividends equal to 60, 70 and 90 percent of capital invested and in a single instance even 125 percent." *

Germany could hardly refuse this type of protection when the other nations of Europe continued to pay export bounties. The whole system resulted in a kind of cut-throat competition, whereby the purchasers in other countries received sugar for less than they themselves could produce it, and even at a lower price than the cost of production in the exporting country.

This system of protection for agricultural products did not prevent or even lessen the severity of the agricultural depressions. A rather severe depression occurred in the eighties for the German sugar producers.

"The markets were flooded and the price fell over 50 percent in six months. In Bohemia the largest sugar company repudiated their contracts for beets. In Silesia the farmers wanted a government guarantee of three marks for every hundredweight of beets for the next three years." ** "The immense profits which within the last few years have been secured to the farmers ought to have helped them through the present crisis, but they have spent their money as if the years of plenty would never end. The rich manufacturers instead of sharing with them the export bonus, stand behind them, and through them appeal to the government's sympathy for agricultural interests in order to obtain their protection at the expense of the taxpayers and to enrich themselves afresh." ***

The first part of the quotation sounds as if it might have been

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written about conditions in the United States following the high prices of the World War, while the second part represents what might happen if some of the present proposed plans of bounties and equalization fees were adopted.

The chief gainers from the system were the British consumers as well as the jam makers and confectionery producers who could buy sugar from the continent much cheaper than from the colonies. The refiners in Great Britain were opposed to this system. The sugar producing colonies also objected. Jamaica was forced to substitute the growth of fruit for the American market for sugar cane; but some of the island possessions were not geographically situated so that they could cultivate a different crop.

In the United States, the other great sugar-consuming country, the sugar producers could not successfully compete with the foreign bounty system. They then appealed for protection. The Dingley Tariff Act of 1897, required the Secretary of the Treasury to levy countervailing duties equivalent to the bounties paid in the exporting countries. These duties were put into effect against all countries except Russia who maintained that her system of taxation was not equivalent to a bounty. On February 12, 1901, countervailing duties were enforced against Russia. Only four days later Russia levied a retaliatory tariff of an additional 30 percent net upon American hardware, iron, steel, boilers, pipes, forgings, castings, tools, gas and water meters, dynamos, & sewing machines. This also included motors and machines of all kinds.

In March 1899, the Council of India passed an act authorizing
the imposition of countervailing duties on bounty-fed articles at the
at the port of importation. In 1901, the British Government announced
its intentions of imposing countervailing duties. This was largely due
to the continued plea from her colonies. The British Royal Commission,
in 1896 was sent to the West Indies to investigate the sugar situation.

Attempts were made to remedy the evils of the bounty system
by calling conferences of the nations involved. Eight conferences were
held between 1863 and 1901. The first seven were complete failures.
The last one held at Brussels in 1901, came to an agreement which was
signed, ratified and put into effect in 1903. This practically ended
the system of sugar bounties. The success of this conference was due
largely to the fact that countervailing duties had been passed by
United States and India and threatened by England. It was also due to
the fact that the countries paying the bounties were finding it in-
creasingly difficult to raise the money for bounties from taxes.

This experience with bounties is never mentioned by advocates
of relief legislation in the United States. There is very little
resemblance between the cases, but any comparison that can be drawn
is detrimental to the proposed schemes. The following are the most
important results of the system. The system of bounties increased pro-
duction; they had no effect in preventing or relieving depressions;
other countries, (the United States first) passed countervailing duties
to offset the effect of the bounties; and it was an expensive experiment
for the country paying the bounty.
Control of Coffee, Sisal and Rubber.

The conditions underlying the production of these products are so similar that for the purpose of general discussion, they may be grouped together.

(1) In each case the region or area produces the major part of the world's supply. Brazil produces about 65 percent of the coffee, Britain's Middle East Possessions about 70 percent of the rubber, and Yucatan produces practically all of the sisal. Control over such a large part of world supply is sufficient to have considerable effect on the price of the products.

(2) Practically the entire output is exported. Brazil uses only about 5 percent of the coffee produced and in case of rubber or sisal the exporting country consumes practically none of the product. On this basis, any gains from higher prices accrue to producers in that country but come from the consumers in other countries. It is of interest that in each case, the United States is the chief consumer of these products and therefore is the chief loser when the control measures really raise prices over a long period of time.

(3) In each of these products, the time required from the planting until the harvest of the first crop is from six to eight years.

(4) The capital outlay in each case of starting a plantation is large, from about $200 to $400 per acre.

(5) More land is available for the production of these crops in the regions where they are now grown than is necessary to supply the world's needs at a price that will bring any returns on capital outlay.
(6) After plants have been brought into bearing, they continue to produce for many years.

(7) In the areas producing these crops, they are practically the only enterprises so that if prices are low, a severe depression follows.

The natural consequences of the last five points need further explanation. In practically every type of production process where there is not any form of central control, the maladjustments that occur are greater as the period of time required for production increases. Previous analysis has shown that there is expansion or contraction of cotton acreage every other year. High prices stimulate increased acreage, low prices cause further reduction in acreage than would have been made if there had been central control or better knowledge on the part of producers. The cycle for hog production is repeated about every three years. The cycle for horses occurs about every seven or nine years. In each case, the frequency of production cycles is largely determined by the length of time necessary for production. With the opening of the regions growing coffee, sisal and rubber to large-scale farming, there was a very rapid expansion in acreage.

In Brazil there were so many coffee trees planted by 1902, that the government in that year tried to prohibit further planting for several years. There has been no additional planting since 1906. From 1880 to 1906, production in Brazil increased from 5,000,000 to 23,000,000 sacks. The production has never again equalled that of 1906. In that year the government bought 8,500,000 sacks. These were warehoused and sold later. The next attempt at control came in 1917 after the war had caused a slump in the European demand. The same
method of buying and storing by the government was followed.

In 1921, a new policy of control was inaugurated. The coffee is now produced in the interior and shipped to the coast by railroad. The new policy limits the number of sacks of coffee that can be carried per day by the railroad. In 1921, it was 30,000; in 1922, 28,000; in 1924, 35,000; while in May 1925, it was reduced to 20,000. Nine warehouses have been erected in the interior in which to store coffee. It is taken out of these warehouses in the order that it was put in. Recently, the Institute for the Permanent Defense of Coffee has been established. This consists of a board of five members, two representing the growers, and three the government, but all appointed by the president. This board collects statistics, makes loans, carries on advertising campaigns, and controls the shipments over the railroads.

It is not the Central Government of Brazil that carries on these activities but mainly that of the State of Sao Paulo. Control is called valorization. The extent to which these attempts at control have been successful cannot be determined accurately. Either there are no accurate statistics on the amount of the coffee produced or held in warehouses, or the government does not make them available. The South American Journal* for February 17, 1923, estimates that from March 1921 to November 1922, the arrangement increased the returns from coffee by $27,000,000.

The sisal control program began in 1912 with the creation of a commission to regulate the sisal market. The main object was to free the growers from the control by foreign capitalists to whom they were heavily in debt. The commission purchased stocks of sisal from the

* Page 171.
growers with funds raised from taxes paid by the growers on each kilo produced. The first commission never really accomplished very much, because the tax did not provide enough funds. The plan was revised in 1915 and the government entered into contracts with growers to deliver the product to them. The funds of the organization were built up to $50,000,000. Buyers were forced to buy from the commission. In 1919, the commission was liquidated. Failure seems to have been partly due to financial irregularities and public grafting. Following this, the industry was greatly disorganized. Prices fell very low; plantations were neglected, production decreased from 935,000 tons in 1920 to 461,000 tons in 1922. Plantations neglected for any length of time cannot be fully restored.

In 1922, a new quasi-governmental commission was established. A tax of $3.12 cents per pound must be paid on all exports except those made by the commission. This forces the entire output into the hands of the commission. This commission at one time held as much as 500,000 tons of sisal. The commission required growers to limit production from 15 to 50 percent until the surplus stocks were disposed of. They also tried to maintain the plantation on a producing basis. Mr. Culbertson, formerly of the Tariff Commission, estimated that the price was one cent higher per pound in 1924, than it would have been without the commission.

The rubber plant is a native of South America. In 1876 a man by the name of Wickham smuggled seeds out of South America, germinated them in the Kew Gardens in London and shipped the plants
to Ceylon. In 1905, the total world production was 62,000 tons of which only 145 tons were raised on plantations, the rest from wild trees. The success of raising rubber by cultivation along with the increased demand, caused very rapid expansion of cultivation. By 1914, the total production had reached 120,380 tons of which 71,380 were produced on plantations. The rapid increase in supply hardly kept pace with the increased demand due to the use of automobiles. Between 1910-14, there was very rapid expansion in plantings. During the war, large stocks were accumulated and the large plantings before the war began yielding more than current needs at prices satisfactory to the producers. The prices per pound of rubber have varied greatly. In 1910, the price went up to $3.12 a pound. In 1920, the price fell as low as 14 cents. In 1925, the price rose temporarily to $1.21 per pound. The producers calculate that a price of 36 cents per pound is necessary to pay returns on investments and at the same time stimulate further production.

Following the slump in prices in 1920, the producers formed a voluntary organization to restrict production, but as many failed to cooperate, the plan was not a success. In 1921, the government adopted a scheme of compulsory restriction known as the Stevenson Plan. According to this plan, the year 1919-20 was taken as normal and production was limited to 60 percent of normal depending on the price changes. The aim was to stabilize prices between 30 and 38 cents per pound. The percent of normal production allowed was to be increased or decreased every three months depending on the price.
Following the adoption of the plan, prices rose a little but continued under 30 cents. The American buyers were operating more on a hand-to-mouth policy than formerly. They accumulated little or no inventories. In October 1924, production was reduced to 50 percent of normal. Prices increased greatly due directly to the plan of limiting production, but indirectly to the policy of buyers in America. By February 1st 1926, 100 percent production was allowed. Demand has been increasing rapidly due to the increased use of automobiles and the change to balloon tires. The estimates for this year put possible production as 623,000 tons as against an estimated demand of 608,000 tons.

The problem of adjusting production to consumption is great in the case of coffee, sisal and rubber because of the length of time involved. The main feature of the control measures applied to these commodities is to control price by regulating production. In each case, this regulation appears to have been necessitated because of too rapid an expansion at some previous time. To say as some writers do that these plans are contrary to the Law of Supply and Demand and are therefore pure cases of monopoly sounds well but does not mean anything. The operation of natural forces may bring about some kind of an average adjustment over a long period of time, but it may also bring about continual maladjustment in the form of cycles. Because these plans make prices higher at one period than free trade would, they may also make them lower at other times.

During the period of restriction, these plans tend to bring larger incomes to the producing regions by making other
countries pay higher prices for their products. In this respect, they are very different from those proposed in the United States which would bring a larger income to one class within the country at the expense of other classes within the same country. Foreigners are not expected to pay more for the products; they are rather to get them cheaper.

The only crop in the United States that is at all similar to these crops is cotton. The United States produce most of the world supply and export most of what is produced. But cotton is an annual crop and is produced mainly on small farms, which would make control over production difficult. This difficulty would also be increased because in many sections of the cotton belt, cotton is not the only crop.

Complete monopolies by any one country or region is not possible in case of coffee, rubber, or sisal. There are several areas where sisal could be grown and if the price is high, manila hemp can be used as a substitute in making the main product. The Dutch East Indies produce about 25 percent of the output of plantation rubber, and they refused to join with the British in any control measures, but operated at a maximum output and received the full benefits of any increased prices caused by the operation of the Stevenson Plan. Other regions perhaps not as well suited for rubber as those now in use exist. Firestone interests have taken a 99 year lease on 1,000,000 acres in Liberia. The world may again be oversupplied with plantation rubber in spite of England's attempt to prevent production cycles. Regions other than Brazil which produce 35 percent of the world's supply of coffee
can still further increase production if prices go very high. In the meantime, they receive the full benefit without any costs from the Valorization scheme. Even when the boll weevil curtailed production of cotton in the United States, acreage was expanded in South America, Africa, Asia and Australia. It appears as if monopoly control of any of these products can at best be only temporary.

**Cuban Control of Sugar.**

The conditions surrounding the production of sugar in Cuba are similar to those described for coffee, rubber, and sisal except that Cuba controls a smaller part of the world's supply and production is practically on an annual basis. Most of Cuba's sugar comes to the United States under a preferential duty and since it produces most of the sugar consumed in the United States, prices may be increased to the amount of the preferential duty by limiting production.

In May 1926, the Congress of Cuba passed an act empowering the President to fix the date when grinding of the crop should start. The act further limits production by the placing of a prohibitory tax on all sugar produced above 90 percent of the crop estimate.

This plan has only been in operation a short time and there are so many other factors affecting the price of sugar, that it is impossible to tell how successful it has been. The main point of interest is the fact that the system of control is principally that of limiting production.
England's Control of Wool

Shortly after the outbreak of the world war, England began to exercise control over the supply of wool from her colonies especially Australia and New Zealand. The object of this control was twofold: to assure England and her Allies of a supply for military purposes and to prevent any wool from reaching her enemies. The degree of control varied from an embargo on exports to certain countries to a policy of price fixing and governmental regulation of the entire output. When the war ended, the government had on hand over two million bales of wool. Immediate sale would have depressed prices greatly so they disposed of the accumulated stocks by auctioning off a portion at a time. The last bale was sold on May 2, 1924 six years after the war ended.

This case of control over an agricultural product bears no resemblance to the conditions underlying the agricultural depression in the United States since 1920, because no great stocks of American agricultural products accumulated during the war.

Plans for Agricultural Relief in the United States.

Numerous schemes for the alleviation of the present agricultural depression have been suggested. Some of them have been plausible enough to receive consideration by legislative bodies. For convenience, all plans may be divided into three classes.

(1) Advice to the farmers to help themselves. This includes such suggestions as, that the farmer should diversify, plant
less acreage, cut down expenses, and so on. The farmers that have poor combinations of enterprises can improve their own conditions by following this advice, but such changes will not give general agricultural relief. If the cotton farmers raised a little more corn it would not help the corn producers. Likewise if wheat farmers raised more dairy cattle, it would not help the dairy industry. For all farmers to be more self-sufficient would reduce their standard of living rather than to increase it.

(2) Legislation to help the farmers without directly affecting the prices of the products. Many of the laws that fall in this class have been adopted. The Intermediate Credit Banks and State Rural Credit Acts are examples. Loans by states have reduced the interest burden of some operators but have been a greater aid to financial institutions than to the farmers. It helped them to liquidate a number of mortgages held on farm property. Economy measures by federal and state governments have tended to reduce taxes, but since the farmers pay directly only a small part of these taxes, this has had very little effect on farmer's incomes. The tariff has been increased on some agricultural products, butter, for example. This helped one small group of farmers at the expense of the rest of society. Some newspapers are even trying to make the farmers believe that President Coolidge increased the tariff on pig iron 50 percent in the interest of their welfare. Two laws were passed by the federal government that may eventually help the agricultural class.

The Purnell Act of February 24, 1925 makes a continuous appropriation for research in problems connected with agricultural economics, home economics, and rural sociology. The Cooperative
Marketing Bill in 1926, created a separate Bureau of Cooperation in the United States Department of Agriculture, to aid and assist cooperative agencies on solving their problems. These laws do not give immediate results and do not satisfy or propose to satisfy the immediate demands of the farmers.

(3) Legislation to help the farmers by raising the prices of agricultural products. The manner of obtaining this goal, is essentially the same in all the proposed plans. They aim to raise the prices of certain domestic products by exporting a larger portion of the quantity produced than at the present time. A few of the plans are also intended to equalize variations in production by storing from one period to another and by regulating the flow of the product to the consumers. The plans differ in the method by which the increased exportation is to be brought about, and in respect to the agency that is to carry on the work, as well as in the method of providing for the payment of expenses.

Professor H. Hibbard of the University of Wisconsin suggests that all custom revenue derived from the duties on agricultural imports, be paid as a bounty to exporters of certain agricultural products. Dr. L. C. Stewart of Illinois advocated the export debenture plan, The McKinley Bill of 1926. According to this plan transferrable debentures would be issued to exporters of specified agricultural products at fixed rates per unit of product. These debentures should be receivable at their face value in payment of the tariff duties on any imported goods. The Norris-Sinclair Bill provided for an export corporation. This corporation was to be a governmental
institution. It should stand ready to buy up the surplus, if it were necessary to raise prices. The government would pay for all expenses or losses. Former Secretary of Agriculture, Meredith, advocated a plan of having the government fix a minimum price in advance of planting. The government would buy any surplus left at the end of the year and store or dispose of it in foreign countries. Any deficits would be paid by the treasury. The Export Bounty Excise Tax Plan advocated chiefly by Mr. R. C. Noyes of St. Paul, Minnesota, proposed to levy an excise tax on all units of specified commodities entering marketing channels. This revenue would be paid as a direct bounty at a specific rate per unit of product to the exporters by custom officials. This method of raising the necessary revenue was essentially the same as that of the equalization fee of the McNary Bill.

This brief survey of certain of the proposed schemes for farm relief, covers only a few of the plans but is sufficient to show that they are essentially alike. Prices are to be raised by increasing exports and not by controlling production. An analysis of these plans shows that they would have different effects on the consumers. According to the first four, the consumers would have to pay both the higher prices, and the costs of operating the scheme through some form of taxation. Either the government pays expenses from the treasury receipts or the receipts are decreased. According to the fifth plan, the consumers would pay only the higher prices. The producers would furnish the funds for financing
the adventure. The McNary Bill would affect the consumers and producers in a similar manner. Space does not permit a detailed discussion of more than one plan. This will be made of the one that received the most publicity and came the nearest to becoming a law.

Senator McNary of Oregon introduced Senate Bill 4306 on December 14, 1926, which was read twice and referred to the committee on Agriculture and Forestry. On January 24, 1927, it was reported by the committee without amendment. About the same time, Representative Haugen of Illinois, introduced a similar bill in the House. The McNary Bill with minor amendments was passed by both the Senate and the House of Representatives but was vetoed by President Coolidge on February 25, 1927.

The McNary Bill is essentially the same as the old McNary-Haugen Bill introduced at the previous session of Congress. It differs from the old bill in some of the details but principally in that no mention is made of the tariff. The original bill included increased tariffs for some of the products. This ought to be one of the essential features of such a plan. If bounties are paid for exports, and imports are not restricted, there is nothing to prevent people from importing and exporting again in order to receive the bounties. Insofar as there are tariffs on most of the products mentioned, prices could be increased by the amount of the present tariffs.
Section One of the McNary Bill is—

The Declaration of Policy.

"It is hereby declared to be the policy of congress to promote the orderly marketing of basic agricultural commodities in interstate and foreign commerce and to that end to provide for the control and disposition of surpluses of such commodities, to enable producers of such commodities to stabilize their markets against undue and excessive fluctuation, to preserve advantageous domestic markets for such commodities, to minimize speculation and waste in marketing such commodities, and to encourage the organization of producers of such commodities into co-operative marketing associations."

This statement of policy covers a very wide field. After reading the previous sections of this thesis, one cannot help but ask the questions which follow: What is meant here by a surplus? Would the producers of these products really gain if prices were stabilized? As was shown in Part II, they sometimes receive more from a small and a large crop sold as produced than from two average sized crops. Perhaps if prices were stabilized, returns would be still smaller for the farmers, not only because of this but also because producers who are now forced out of the business by one or two poor years could then keep on producing for a longer period.

The preservation of an "advantageous domestic market" might make it disadvantageous in respect to the policy of stabilizing prices. The larger the market, the more stable the prices. Potato prices fluctuate far more than those of wheat. Prices of hay perhaps vary more than those of potatoes. While prices of vegetables and fruits for a local city market have very great variations. Butter is given a home market by a protective tariff,
but tends to vary more in price on account of it.

The effects of speculation are really outside the field of this thesis. According to economic theory, organized exchanges tend to stabilize prices and are the means by which farmers and dealers in these commodities can transfer the risks of price changes to other persons. There may have been a few "corners on the market" of particular agricultural commodities but on the whole, price variations are less in those commodities dealt in on organized exchanges than in those sold in unorganized markets. In no case can these exchanges or speculation (aside from that carried on by the farmers*) be accused of causing a general agricultural depression.

Section Two of the law deals with the creation of a Federal Farm Board of twelve members, one from each of the Federal Land Bank Districts. This section raised a very interesting political question because it required the President to make appointments from a list of eligible submitted by a nomination committee. It was claimed that this limited the President's power of making appointments.

Section Three provides for the Qualification and Terms of Board Members. The nominating committee mentioned above receive no salary but $20 per diem for attending meetings. Salary of the Board Members was fixed at $10,000 per year.

Section Four covers the general powers of the Board. The only thing of interest in this section is that the Board can hire as much help as it needs subject to civil service regulations.

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* Speculation in land.
Section Five on the Special Powers and Duties is given below in full because it is short and shows the gigantic statistical task assigned to the Board.

"(a) The board shall meet at the call of the chairman, or of the secretary of agriculture, or of a majority of its members.

(b) The board shall keep advised, from any available sources, of crop prices, prospects, supply and demand, at home and abroad, with especial attention to the existence or the probability of the existence of a surplus of any agricultural commodity or any of its food products.

(c) The board shall advise co-operative associations, farm organizations, and producers in the adjustment of production and distribution, in order that they may secure the maximum benefits under this act."

Section Six on the Disposition of Surplus is really the central theme of the bill. Each paragraph of this section will be discussed separately.

Paragraph (a): "For the purposes of this act, cotton, wheat, corn, rice, tobacco and swine shall be known and are referred to as "basic agricultural commodities", except that the board may, in its discretion, treat as a separate basic agricultural commodity one or more of such classes or types of tobacco as are designated in the classification of the department of agriculture."

One may wonder why oats is not included since it occupies much more acreage than either tobacco or rice. It surely is a basic agricultural commodity as far as acreage and value is concerned, although very little is exported. Two other crops barley and rye occupy considerable more acreage than tobacco or rice and a large portion of the supply is exported. It appears as if the inclusion or exclusion of certain commodities was based on political rather than on economic grounds.
Paragraph (b) made a partial provision for other commodities depending on future legislation.

Paragraph (b): "Whenever the board finds that the conditions of production and marketing of any other agricultural commodity are such that the provisions of this act applicable to a basic agricultural commodity should be made applicable to such other agricultural commodity, the board shall submit its report thereon to congress."

Paragraph (c): "Whenever the board finds, first, that there is or may be during the ensuing year either (1) a surplus above the domestic requirements for wheat, corn, rice, tobacco, or swine, or (2) a surplus above the requirements for the orderly marketing of cotton, or of wheat, corn, rice, tobacco, or swine; and, second, that both the advisory council hereinafter created for the commodity and a substantial number of co-operative associations or other organizations representing the producers of the commodity favor the full cooperation of the board in the stabilization of the commodity, then the board shall publicly declare its findings and commence, upon a date to be fixed by the board and published in such declaration, the operations in such commodity authorized by this act."

This paragraph contains a form of a definition of a surplus. For the commodities named, there are and have been for considerable time, more than the amount needed for domestic requirements. If this means that this board would exercise continuous control, the effects may or may not stabilize prices depending on how the board acts. To take hogs as an example, production and price now fluctuate in about a three year cycle. There are some exports even when production is small. If prices were only manipulated when production was large, it might tend to eliminate the cycle, but if prices were manipulated when production is also low, there would be the same cycles as before only the general level of prices would be higher. Undoubtedly the producers would try to have the board act so that prices would be higher all the time forgetting that they asked for stabilized prices.
The second type of surplus, a quantity above the requirements for orderly marketing apparently assumes that the present marketing system is wholly inadequate and that wholesale remedies can be applied to the marketing problem. Cooperative marketing tends to solve this problem but progress is very slow. The gains are often very small and many producers are not willing to cooperate. It is doubtful if cooperation or combined action can be forced on the producers.

The last part of Paragraph (c) of this section of the law is not quoted. It requires that a majority of the producers of such a commodity must favor action by the board before it can operate. This might make the act inoperative even if made a law. To get the producers of the largest part of the supply to agree would be a hard task but easier than to get the majority of the producers to agree.

Paragraph (d) of Section Six is as follows:

(d) "During the continuance of such operations in any basic agricultural commodity, the board is authorized to enter into agreements, for the purpose of carrying out the policy declared in Section 1, with any co-operative association engaged in handling the basic agricultural commodity, or with a corporation created by one or more of such co-operative associations, or with processors of the basic agricultural commodity."

Paragraph (f) adds the further provision that if there are no co-operative associations capable of carrying out the agreements, the board may make agreements with other agencies. The farmers would tend to receive the benefits (if there were any) if cooperative associations carried out the agreements. In the
case of hogs, there would be practically no other agency than the big packers. Would they be willing to do it? Would they return the gains to the hog producers? Or would they make enormous profits as the German sugar factories did under the Sugar Bounty Plan?

Paragraph (e) contains details of the agreements between the board and the selected agency. It practically restates Section One. It does contain one interesting provision. The board can insure any agency engaged in carrying out the agreements against losses from changes in prices. Insurance is usually based on the principle that by pooling a large number of cases, the losses can be predicted with a considerable degree of accuracy. Price changes affect all units of the commodity at one time and cannot be predicted in the same manner as fires or deaths.

Paragraph (h) specifies that the board shall have power over the food products made from the basic commodity, other than cotton and tobacco. This means for example that action of the board may be extended to flour and pork products.

Section Seven deals with the creation of an advisory council for each commodity. They are to serve without pay but their expenses are to be paid by the board. Their chief function is to aid and assist the board in getting the facts and determining the policy in respect to each commodity.

Sections Eight, Nine, and Ten provide for an equalization fee to be collected on each unit of commodity. The amount of the equalization fee is to be determined by the board as well as the place and method of collection. The fee may be collected upon transportation,
processing or sale. This fee is to provide the necessary funds for all action by the board. It is to cover the cost of holding the product off the market as well as the necessary bounty to induce exports.

It may be well to explain briefly how this is expected to work. Assume that the world price of wheat is one dollar and that one-fifth is now exported. If a bounty is paid on exportation, more will be exported perhaps one-fourth. This would cause a scarcity in the home market and prices would increase depending on the amount exported. World price would change very little because extra exports would be a much smaller fraction of world supply than of the domestic supply. The returns for wheat would now be more than a dollar, perhaps $1.37 for three-fourths of the amount produced and perhaps $.99 for the other one-fourth or the average price for the entire production would be $1.275 per bushel. The wheat would all sell for $1.37 per bushel and a tax of $.095 per bushel would be necessary to bring average price down to $1.275. The tax would also have to cover operating costs of perhaps $.025, but by this system, the farmers would receive $.25 more for all the wheat produced. The consumers in the United States would pay about $.12 per bushel more than the farmers received. Most of this difference would be donated to foreign consumers in the form of cheaper food.

Advocators of this plan maintain that as the producers increased acreage, they would see that the amount of the tax became greater and in this way the equalization fee would curtail or control production. The above illustration was chosen to increase price one-fourth the approximate real increase in wheat prices during the
war when acreage expanded almost one-third. The tax does not fall on the additional units produced but on the entire production.

In the control measures tried by other countries especially in the control of rubber, the tax collected is progressive on all units produced above a fixed amount and therefore it curtails production. At present farmers as a group know that if they all produce more, the price is less but each individual does not curtail production on that account. Germany under a somewhat similar system increased production of sugar from less than the domestic requirements to the point where ever half the product was exported. England instituted the bounty system in the Corn Laws, primarily to encourage production; All past data on various crops as well as the reasons for the hog cycle show that the farmers increase production as prices increase. There can be no doubt that the continuation of artificially high prices over a period of years would lead to increased production in the favored commodities. This would of course result in some decrease in other crops. For instance many North Dakota flax producers would turn to wheat, as they did during the war. A higher tariff on flax would then be necessary in order to maintain the present production.

The other important question is, what would other countries do? In practically every case, there are a few producers in the importing country as well as other competing countries, that would object. The United States was the first country to take official action against the same type of a bounty when applied to sugar. Since that time, many countries have passed comprehensive anti-dumping laws. Countries not importing, may pass retaliatory duties to offset the unfair competition. The net result would be, tariff wars between nations.
Section Eleven gives the board exclusive control over the funds with the exception that it limits the rate of interest to 4 percent on loans.

Section Twelve deals with loans and insurance and limits the total loans to $25,000,000 and the duration of any loan to 20 years. It also limits the time of insurance against price changes to 12 months. If prices are to be stabilized by holding products from one large crop over to a short crop, storage may be necessary for two, three or more years. Limiting the period of insurance to 12 months, makes this feature of the act almost worthless, even if for the other reasons it were satisfactory.

Section Thirteen prescribes rules for examination of accounts.

Section Fourteen makes cooperation of other government agencies with the board mandatory. It also gives the board permission to cooperate with any agency or person.

Section Fifteen defines specifically most of the terms used in the bill except exactly what constitutes a surplus. This apparently is left to the discretion of the board.

Section Sixteen provides for the creation of a revolving fund of $250,000,000 to be used in anticipation or in advance of collecting equalization fees. It also calls for an appropriation of $500,000 to cover expenses for one year (to July 1st, 1928).

Section Seventeen provides that if any section or part is declared invalid, it is not to affect the rest of the act.
Aside from the comments made on particular points, some may be made of the measures as a whole. If it worked, it would raise prices in this country and give the farmers a larger share of the national income. Whether or not it would work depends largely on the action of the board and the action taken by other consuming or competing countries. As a temporary relief measure, it might have been successful if adopted in 1922 and removed in 1924-25. As a permanent solution for agriculture, it would not be successful. It cannot remove variations in yields caused by weather, diseases, etc. It might if applied periodically and not continuously aid in periods of general depression, but the act appears as a continuous procedure and therefore would only lead to vested interests and leave the same cycles of prosperity and depression as formerly. The outstanding weakness of the measure is that, it proposes to control prices without any control over production— an almost impossible task. Increased prices without limited production will lead to increased production, unless standards of living of the rural population can be increased as fast or faster than prices rise.

President Coolidge covered most of the above objections to the bill in his veto message. In addition to this, he made other objections to it. He said that it would be almost impossible to carry out all of the necessary operations because there are so many agencies engaged either in the transportation or the processing of these commodities. Two of Coolidge's main objections may be perfectly sound from a social point of view, but it seems illogical to be so socially minded when the question is applied to agriculture and then to completely forget the same principles in connection with other industries.
"The difficulty with this particular measure is that it is not framed to aid farmers as a whole, and it is, furthermore, calculated to injure rather than promote the general public welfare."

No one ever expected this measure to help all farmers but only the majority of them. There never was a tariff which benefited everyone! Practically all industries using steel, especially shipbuilding, have not benefited by the tariff on steel. It is also doubtful if this or any other tariff has promoted general public welfare.

"This so-called equalization fee is not a tax for purposes of revenue in the accepted sense. It is a tax for the special benefit of particular groups. As a direct tax on certain of the vital necessaries of life it represents the most vicious form of taxation. Its real effect is an employment of the coercive powers of government to the end that certain special groups of farmers and processors may profit temporarily at the expense of other farmers and of the community at large."

As far as the tax is concerned, the people who pay it are the ones who receive the benefit from it. So in this way, it is not a vicious tax as long as the tax-payers receive more benefits than the amount of the tax. It is not the direct tax that affects the consumers, but the indirect tax through higher prices. Most tariffs raise prices for the benefit of one group at the expense of the community at large and may be called a vicious form of taxation.

President Coolidge also made the following statement.

"The chief objection to the bill is that it would not benefit the farmer. Whatever may be the temporary influence of arbitrary interference, no one can deny that in the long run prices will be governed by the law of supply and demand. To expect to increase prices and then to maintain them on a higher level by means of a plan which must of necessity increase production while decreasing consumption, is to fly in the face of an economic law as well established as any law of nature."

The first part of this statement is incorrect. If the plan were
put into operation, it would benefit the farmers although it might hurt the rest of society more than it helped the farmers.

The part of the statement that refers to the law of supply and demand sounds well but does not mean much. It is statements like this that put economics as a science into disrepute. It would be just as sensible to say that aeroplanes cannot fly because by the law of gravity everything falls towards the center of the earth at a certain rate of speed. The law of supply and demand is nothing but a statement of a general tendency and does not in any way mean that either or both supply and demand cannot be changed or controlled. All advertising succeeds to some extent in changing demand. All tariffs, monopolies, and such legislation as the Eighteenth Amendment succeed to some extent in controlling the supply. The chief objection to the Monary plan of farm relief is not that it flies in the face of an economic law, but that it does not provide for a system of regulating the supply.
The National Industrial Conference Board came to the conclusion that conditions have been adverse for agriculture since the beginning of the century. They also concluded that conditions since 1920 are chiefly the reflection of disturbances and upheavals of the war and the post-war period. This report paints a more dismal picture of the depression than is justifiable. The conclusions in respect to the trends are based mainly on an analysis of the costs of production and the declining importance of agricultural exports. The analysis confuses cost and income. Capital costs, as they call them, are practically interest on land values. Increasing land value over a long period of time, tends to represent increased incomes to agriculture as a whole. For any short period of time, increased land values may represent mainly increased speculation in land.

The declining importance of agricultural exports has little or no direct bearing on the returns to agriculture. Insofar as there is any relationship existing between the importance of exports and the returns to agriculture, it tends to be just the opposite from that inferred by the National Industrial Conference Board. The value of agricultural exports has increased but not as fast as those of manufactured products. Manufacturing has become more important than agriculture in this country, both in terms of the value of the product, and in the number of people
gainfully employed. This does not indicate that the conditions are or have been, adverse to agriculture. If exports of agricultural products were to disappear entirely, and this country were to become a large importer of food, no doubt the conditions would be still more favorable for agriculture. In such a case, the prices of farm products in the United States would tend to be world prices plus the transportation costs, and any tariffs on these products. At the present time, the prices tend to be world prices minus transportation costs.

From a long-time point of view, conditions have been favorable to agriculture. The costs of producing agricultural products have remained fairly constant. Due to inventions, improvements in technique as well as to the opening up of new productive regions, the cost of agricultural products has been relatively constant. The classical economists predicted increasing costs of agricultural products as the population increased. Up to the present time, improvements, inventions and technique have practically kept pace with the increase in the population. The time when population will press on the food supply, appears further away now than it did at the time of Malthus.

The cost of production of manufactured goods has decreased over a long period of time, with the result that the purchasing power of farm products has increased, but it must be remembered that this has been interrupted by numerous short-time changes. The largest changes have occurred during and after wars. The changes were very similar during the war of 1812, the Civil
War and the World War.* There can be no doubt that the recent changes were due mainly to the circumstances brought about by the World War.

Other major variations in the purchasing power of farm products correspond closely to the changes in general business conditions or what is commonly referred to as "the business cycle". "When industry is depressed, the market for farm products is poor for two reasons: first, because manufacture consumes a large part of the raw materials produced on farms (80 percent of raw materials used in manufacture comes from farms), and second, because the purchasing power of wage-earners (much of which is applied to farm products directly or indirectly) is low in the period of depression due to prevailing unemployment."**

Year to year fluctuations in purchasing power of farm products are due mainly to variations in production. In no case can it be said that the rapid expansion caused a severe depression for it only affected long-time trend. Purchasing power of farm products rose rapidly from 1820 to 1860. During the period of rapid expansion from 1870 to 1900, the general trend was upward, but at a much slower rate. From 1900 to 1914, the upward trend was more rapid than from 1870 to 1900. The war stimulated still higher prices.

The termination of the war and the post-war inflation period brought on a general business depression. Prices of farm products fell more than those of the other commodities and have remained lower. This depression beginning in 1920 is the most

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* United States Department of Agriculture Bulletin 999. G. F. Warren, "Prices of Farm Products".
severe agriculture has experienced since the Civil War. Numerous explanations of the causes of the situation have been advanced, also many remedies. The term, "Agricultural surplus" has become the "catch-all" phrase applied to the problem. Other industries recovered but agriculture remains more or less in a state of depression.

In trying to explain the causes for these changes as well as in trying to discover remedies for the evils resulting from them, many people misinterpret the facts and also propose remedies that are not economically sound.

Every one know that there is some relationship between the amount produced and the prices per unit of product. Because prices of farm products fell and remained low, many people infer that there must have been some change in the physical volume of the goods produced or the amount exported. But there was no rapid expansion of agriculture during the war. Exports of agricultural products did not decrease when the depression started. From the standpoint of physical units of agricultural products, there has been no surplus quantities since 1920, if we measure quantity relative to previous quantities either produced or exported. If physical quantities are measured on a per capita basis, production has not kept pace with the increase in the population. The per capita production of agricultural products has decreased since long before the imaginary war expansion.

Although the term surplus implies some change in the physical volume of goods, it is usually thought of in relation to the returns from those goods. Large crops often bring less total returns than smaller crops. Knowing this to be a fact, many people propose
plans for limiting production to such an extent that producers would receive the largest returns.

This concept of a surplus, as a quantity so large that it reduces the total net and sometimes the total gross returns from the supply put on the market, is entirely invalid from a social point of view. Such quantities exist for practically all goods and services, produced under conditions of competition or regulated monopoly. Gains to one or a few groups of producers at the expense of the rest of society could be obtained by limiting production. If all or a large number of producers, tried a similar procedure, there would be a smaller number of units of product to be divided among the same number of people, and everybody would receive a smaller real income.

Many of the advocates of reducing production, do not propose to limit it to such an extent, that the producers receive monopoly gains, but only to the extent that the selling price covers the costs of production. This brings up the whole question of what constitutes costs. Land rent in any of its various forms, cash and share rent, interest on mortgages, or the operator's own investment is not a cost of production for any crop or product as a whole. To individual operators, it is an expense which must be covered if they are to continue producing, but for the industry as a whole, land rent represents the difference between costs and selling prices and is income and not costs. This income as well as the expected increases in it, is capitalized into land values. Land rents cannot be included in the costs of production for any crop or product.
The costs of production which must be covered by the selling price of the product, are expenses for use of machinery, buildings, fertilizer, twine etc., but especially labor costs. They cannot be determined accurately. In the last analysis, a man's time is worth just what he receives. If he receives less than he could get elsewhere, it would seem logical to include as costs, the alternative opportunity. All returns to people engaged in various occupations cannot be measured, especially in dollars. Returns cannot be compared for brief periods of time.

It appears as if the farmers as a class have made smaller yearly incomes than some other classes in society. They have settled on new lands and have produced so much product that prices have appeared too low to cover costs. These same farmers have looked forward to the time when population would increase to such an extent that land values would rise, so that they could sell their land for enough to make up for any small yearly income. In spite of the low yearly incomes to the people engaged in agriculture, and the perhaps higher incomes in other occupations, more land was continuously brought into use up to 1920. If there had been no tariffs, in all probability the incomes to other classes would have been relatively lower as compared to agriculture. Or stated reversely, agricultural incomes would have been relatively higher as compared to that of other classes. If this had happened, undoubtedly agriculture would have been expanded still further relative to industry.

The future incomes expected by farmers gradually materialized up to 1920. Those who sold out perhaps received as high or higher yearly incomes than those engaged in other occupations, if
returns from the sale of the land is divided by the number of years they owned it, and this added to the yearly incomes they received from operating the farms. When the depression came in 1920, yearly incomes were immediately reduced and the expected future increases in land value almost vanished. Those who had expected to turn land values into cash found that their assets were not worth as much as they had hoped. They were not repaid for accepting low yearly incomes in the past. Present yearly incomes were also lower than they had been for many years. Therefore the conditions since 1920 seem almost unbearable. The farmers who bought land during high prices were more seriously affected. In most cases, they only paid part of the purchase price and gave a mortgage for the rest. When prices fell, they did not only receive smaller yearly incomes than they had expected, but they had to turn over to non-operators a larger percentage of this income, in the form of interest on indebtedness.

During this same period incomes of other classes tended to increase. This made the relative position of agriculture appear more unsatisfactory. With low incomes in agriculture and higher ones in the cities, very few people began to farm while many abandoned the land, with the result that total acreage decreased and there were 77,000 less farms in 1925 than in 1920. This reduction in the number of farms has been offset by increased efficiency so that there has been no reduction in the physical quantity of goods produced. At the same time, there have been some changes in the consumption habits of the people. To some extent, less food is needed, but the main change is from the staple foods to fancier foods. The adoption by many farmers and business men of power-driven
vehicles has reduced the demand for horses and consequently the de-
mand for the product of millions of acres of land. The results of
these changes have been to keep yearly incomes to farmers low and
to wipe out to a considerable extent the possibility that they will
increase in the near future.

Farmers suffer directly from the changed conditions. Other
enterprises lose indirectly through the reduction of markets for
their products. The farmers as a class want some form of relief,
and many of the business men would like to help them get it, if
they could also benefit by it. The whole problem can be summed up
in one question, Can the incomes of the farmers be increased? In-
come is used here to mean precisely the same thing as the standard
of living. The causes of the problem may also be stated very brief-
ly. There are too many farmers relative to the past capitalization
of land values and relative to the present needs of society. Such
brief statements may be easily misunderstood, but are to be inter-
preted only as summary statements of the previous conclusions dis-
cussed in this thesis.

From a purely social point of view, it is desirable that
all classes in society should receive nearly equal returns for
equal effort and ability. It is also desirable that fluctuations
should be reduced to a minimum.* Wars, business cycles, produc-
tion cycles of particular products, variations due to weather, in-
sects, etc., all cause changes that affect some particular group or
individuals. To this, may be added other causes perhaps different
in their fundamental nature, but nevertheless responsible for many

* Exception may be taken to this statement on the ground that such
fluctuations may stimulate progress.
changes; laws of various kinds, especially tariffs and taxes, compulsory education, control over some industries, such as railroads. In fact every change that is usually meant by the word, dynamic, affects society and consequently the industry of agriculture.

Society cannot remake the past but it ought to profit by past experiences in guiding the destinies of the future. If society has injured a particular group in the past by some unwise action, it may be justified in granting the injured group a subsidy or an out and out bonus. The present depression in agriculture is due mainly to the independent action of individual farmers. They were not successful in their forecasts as to the future needs of society. Perhaps society is partly to blame because it practically donated the land to the farmers, but no one would suggest paying them a bonus because they took the land as a gift.

If society does nothing to help the farmers at the present time, agriculture may be contracted still more, or at least not expanded, in the near future as fast as would be socially desirable. The result of such action would be a relative scarcity of farm products, and high prices. This would stimulate a "back to the land movement" and the cycle of too many farmers would be repeated. There is some fear that if nothing is done there will develop a type of peasant farming in this country. There may be some relationship between the development of peasantry and depression, but the reasons for peasantry are more closely connected with low standards of living and high land values. Forces at the present are tending to reduce land values, but it is highly improbable that land values can be kept low and total
population continue to increase. Changes in property rights can be made to have considerable effect on land ownership.

There is no natural or exact ideal that can be set up in society as to the balance between agriculture and other industries. New countries that are primarily agricultural try to diversify by protecting industry. Many people think that countries like England and Belgium are too highly industrialized. The United States at the present time, seems to have what may be called a happy medium or what is termed in Part IV as ideal. This country is now practically self-sufficient as far as agricultural products are concerned. It is not self-sufficient in particular products, but in the fact that agricultural exports pay for agricultural imports. It may or may not be possible to maintain this balance. To do so necessitates a change of policy. Industry as well as an increase in population has been encouraged in the past. Immigration restriction tends to prevent a rapid increase in population. Perhaps a repeal of laws preventing the dissemination of information concerning birth control would also help to keep population from increasing as rapidly as at the present time. Preventing increases in population harms rather than benefits present land owners because it prevents land values from rising. Reducing or at least not increasing the encouragement to industry will also help maintain this balance. Direct encouragement to agriculture would have the same effect. A combination of all three of these methods of maintaining the balance, is undoubtedly necessary if anything is to be accomplished.

To maintain the long-time balance is one problem, to
reduce the short-time fluctuations is another, and this is the one of primary interest at the present time. The largest short-time variation in agricultural incomes is due to war. It would be well if war could be prevented, but societies have not been able to do so in the past. Better systems of finance and control over production during war periods would help, if wars must take place. The next largest variations are due to business cycles. During periods of rising or falling prices, the price relationships between various groups of commodities change. Prices of raw materials rise sooner and faster and also fall first and farthest. Agricultural products as a group belong mainly in this class, and therefore are subject to great changes. The time required for the raw materials to pass through the process of manufacture into the hands of the consumers, is the chief cause for the greater changes in the price of raw materials. The chances of changing our whole system of production are very remote. As long as business cycles continue, variations in the prices of farm products will exist. Measures for the prevention of wars and business cycles are important in solving the problem of agricultural depressions but cannot be discussed here.

Variations in yields due mainly to weather conditions and other largely non-controllable factors occur and have occurred. They are not the cause of general depressions but are usually attacked as causes of the farmers' distress during such periods. These changes have little or no effect on farmers' average incomes. It was pointed out in Part II that the losses and gains from such variations offset one another. Proposals to hold part of large crops
over to periods of small crops would reduce the average income in many cases rather than increase it. Insofar as these present uncontrollable factors of weather, insects, and diseases are modified by more scientific farming, development of new varieties and methods of combating insects and diseases, the average yields are increased and other factors being constant, land values tend to decrease.

The fluctuations due to the changes in acreage or to the numbers of animals are usually spoken of, as controllable factors. So far they have not been controlled and perhaps never will be entirely eliminated. More and better statistical data on production and demand in this country and in other countries will provide the basis for adjusting production to consumption. This is only half of the solution. The farmers as a class must be educated to understand and act according to the information presented to them.

Individual farmers are not the only ones that need to be educated to govern themselves on the basis of available information. State and federal governments should not engage in reclamation projects for bringing land into use when it is not needed. Because irrigation or drainage is physically possible, is no sign that it is economically feasible at a certain time. The purpose of state immigration departments should be to disseminate correct information regarding the opportunities within the state, rather than to spread propaganda for the mere purpose of increasing the population of that area. Many land colonization companies are also responsible for the diffusion of questionable data in their
attempts to dispose of land to prospective farmers for their own gains.

The government ought to develop a definite land policy. Such a program should include a classification of all land on the basis of physical characteristics. With this as a foundation and the best forecasts that can be made as to present and future demands, an economic classification of land should be made. The rate of land development for various uses should be adjusted to the needs of society. The Department of Agriculture is trying to work out such a classification at the present time. This involves not only agriculture and forestry, but any other utilization of land. The development of such a plan does not mean that all land will eventually be employed in some productive process. Population may cease to increase before all land that might be cultivated is appropriated. Part of it may be left as a natural haunt for native animals and plants. Just because there is idle land that could be made productive, is no reason for bringing it into use or increasing the population so that it eventually will be needed.

Some of this discussion may seem far removed from the question of an agricultural surplus, but it is necessary to show how inter-related all aspects of this problem are to other economic questions. Failure to see these relationships is not uncommon and, therefore the problem, as well as the remedies, are misinterpreted.

The foregoing discussion of the causes for variations in prosperity shows that remedies applied to agricultural depressions will not remove their causes. Granting that variations due to wars, business cycles, and weather conditions can neither be controlled by the farmers nor by organized society, relief lies not
in control but in the preparation for the reoccurrence of such dis-
turbances.

Successful business organizations build up reserves in the
form of income property other than in the business itself. Such
reserves usually take the form of stocks and bonds of other organiza-
tions and to a small extent cash. If such reserves are necessary
in business, they ought to be more vital to farming, because there
are more variations to provide for. There may be local crop failures,
large crops that are worth very little, and then general periods of
depression. Farmers as a class can increase their own well-being if
their returns in prosperous years are invested in safe securities
which can be sold when incomes are small. For corporations, this
problem is less important than for farmers, if most of their capital
is obtained by selling stock, they do not have to pay any dividends
when returns are low. Farming to some extent is carried on with
borrowed money but the interest charges must be met every year. The
cash rent tenant has the same problem. His rents are fixed in ad-
vance by contract and must be paid. The share rent farmer has the
same problem to a lesser degree. If the returns are low, the land-
lord shares the losses with him, but just the same his returns fluc-
tuate. Business enterprises put some of their surplus reserves into
expanding other enterprises than their own. Farmers as a class put
their earnings into the expansion of agriculture by buying more
machinery, equipment or land. In some cases, the purchase of more
land does not result in an expansion of agriculture but only in
an increase in land values. This tendency of agriculture to expand
when conditions are favorable increases the severity of depression,
as well as the hardships of the farmers when returns from their major crops vary.

If the farmers as individuals can be educated to build up reserves, a large share of their troubles will be solved. Education along this line should perhaps start with country bankers. The average farmer invests his earnings in land, equipment or mortgages, because that is the only kind of investment he knows anything about. He does not know a safe investment and sometimes tries to build up surplus revenues by buying speculative stock from unscrupulous salesmen. If the country bankers knew more about the investment market and tried to sell farmers safe securities, instead of encouraging them to borrow in order to expand agriculture, farmers as a class would benefit.

Standard of living and higher incomes are related. But the cause and effect relationship is not clear and definite. To a large extent the causation is cumulative; higher standards cause higher incomes or vice-versa. For this reason the United States tries to exclude certain classes of foreigners. Farmers as a class have not increased their standards of living as fast as other classes in society. The birth rate in the rural districts is higher than in the cities. Most of the children reared in the country migrate to the cities, but enough remain that with some reverse migration and some foreign immigration all the agricultural products needed are produced.

What the farmers really want is an increased standard of living without moving into town to get it. Society has helped other groups in many ways especially by tariffs and lately by restricted immigration. Why should it not do something for the rural people? Numerous proposals have been made for accomplishing this end. All are alike
in general principle. They propose to artificially raise prices of certain products by increasing the exports and making the consumers in this country pay the increased prices. None of these schemes contain any definite method for restricting future production. If farmers act in the future as they have tended to act in the past, such schemes will result in greater production and increased land values. This would benefit present land-holders but not prospective owners. If attempts were made to make the process of maintaining increased prices continuous, the effects might be as disastrous as those which resulted from the system of sugar bounties in Germany. Other countries are partially successful in control of agricultural products and to some extent limit production. The increased incomes were not paid by the consumers in the same country.

If increased prices resulted in higher standards of living instead of increased production, the results would be more favorable to agriculture. The exact outcome of increased prices cannot be foretold. Education is costly but such an experiment may be worth while. It is just as sound and reasonable as most tariffs on imports. An experiment like that proposed in the McNary Haugen Bill would increase the costs of living to urban people and might open their eyes to the effect of tariffs in general. Two wrongs never make a right, but insofar as tariffs reduce incomes to the agricultural class, they are justified in trying to get some relief. The logical thing of course would be to have other tariffs gradually reduced. The effects of tariffs on incomes to agriculture are usually overestimated. Tariffs tend to reduce
the total income of society and not that of one large class, especially over a long period of time. They ought to be reduced on general principles and not simply because they have some effect on agriculture.

A general gradual reduction in all tariffs, those on agriculture as well as on manufactured goods would be socially desirable. The greatest injustice exists where tariff walls are used as a means of aiding an industry in dumping. Farmers complain that many products are sold cheaper in foreign countries than at home. Jacob Viner* estimates the extent of such practice by United States firms to be somewhere between one-half of one percent and twenty percent of the total exports of manufactured commodities. It is impossible to get exact data. Some of this dumping may be legitimate but the burden of proof must be put on the manufacturer. This could be easily accomplished because statistics of exports of particular commodities are available. The complete removal of all tariffs on products that are exported should be made unless the manufacturer could show social advantages to the contrary. Ordinary protective duties do not prevent other countries from dumping their products in the United States. The removal of tariffs on products which we now export would not encourage other countries to dump their products here, but would prevent this country from dumping elsewhere. If there is any fear of dumping by foreign countries, we ought to have more comprehensive anti-dumping laws and not high protective duties.

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* Jacob Viner, "Dumping in International Trade", page 92.
Dumping by the farmers would be just as uneconomical from a social point of view as dumping by any other industry. The essential nature of the McNary-Haugen plan for farm relief is to legitimize the dumping of farm products and it must be condemned on this ground.

If society feels that it should do something to increase the standard of living of the rural population, that is to grant agriculture a subsidy of some kind, there are other ways of doing it than by increasing prices and at the same time donating cheap food to foreign countries. The government might contribute money to the support of rural schools. Since a large part of the children reared in the country move to the cities, other industries would also benefit from a better system of rural education. It could also donate money for the support of country hospitals and paid doctors and nurses. Such advances would react directly on the standard of living and would have only a very remote tendency towards increased production. Other aids of a somewhat similar nature might be mentioned, such as more aid to roads, greater funds for research, and extension work among the rural population. In this connection, it may be well to state that the nature of extension work ought to change. Extension work in the past has been directed largely to teaching the farmers how to increase production. In the future emphasis should be placed on how to market the product more efficiently but especially on how to live better. By living better is meant the adoption of more conveniences, beautifying the farmsteads and spending more time and money in enjoying life. Taxation reform will help the farmers a little.
Governmental units should raise more of their revenue from income taxes than they do at the present time.

The adoption of a method of taxation not tried in this country might help to eliminate agricultural depressions. Speculation in land is one of the factors that cause periods of hard times for the farmers. Land values are based upon both present and expected future earnings. If all or a large part of the increases in land values due to the increases in population and not to capital improvements on the land were taken by the government in the form of a land increment tax, speculation in land could be reduced to a minimum. It is doubtful if such a tax would yield more revenue than the costs of administering it. This is suggested here only as a means of reducing or removing one of the causes for agricultural distress. A tax of this kind would be seriously objected to by the present land-owners as it would harm rather than benefit them.

In 1905, Cologne adopted a land increment tax. By 1910, about 457 other German cities and towns had applied this method of taxation. In 1910, the national government of Germany adopted this form of taxation for all land. The law was retroactive. The tax applied to increases in values since the last sale or some fixed date, if the property had not changed hands. England also adopted a similar tax in 1910. It applied to all land other than agricultural. In Germany, the tax was levied largely as a means of raising revenue; in England, mainly as a part of their new land policy. In both cases, the land-owners objected seriously.*

* Charles J. Bullock, "Selected Readings in Public Finance". Third edition, Chapter XIX.
A land increment tax may be unconstitutional. Neither the question of legality nor that of the numerous details involved in adopting or administrating such a tax, can be discussed here. A law of this kind could be made to apply to land values as of the present time, or as of some previous date as was done in Germany, or at some future date. It would be easier to pass such a law effective 10, 20 or 30 years hence, and that would cause less confiscation of present property.

If a tax equal to all or the major part of the increases in land values were levied on all transfers of land property, either by sale, inheritance or lease, the effects on land values and the business of farming would be somewhat as follows. A farmer owns land worth $50, without improvements, when the law becomes effective. He receives the full income from the property as long as he operates it. Assume that the land is worth $100 without improvements. When he dies or decides to sell or lease, all of this value would represent current earning power. If the rate of interest was 5 percent, the yearly income from the land would be 5 dollars. A purchaser would have to pay $100, or a renter $5.00. The present owner or his heirs would receive only about $50 if sold or $2.50 yearly if leased. The government would take the balance on taxes. There would be no inducement for people to settle on marginal lands and have a low standard of living because they could not hope to get future returns from increased land values. Owners would be induced to continue operating their farms because their incomes would be larger than if they made leases. Tenancy would also decrease because it would be easier
for people to become owners. Loans could safely be made to almost the full value of the land, because yearly incomes from the land would tend to equal the interest charges on mortgages of this size. The difficulties of putting a land increment tax into effect and of administrating it, would be enormous, but the long-time social advantages would more than offset its disadvantages.

There are changes other than those previously mentioned that would improve the agricultural situation. The two most important are improvements in the credit facilities and in cooperative marketing. Either one is a thesis subject in itself. As far as credit is concerned, it seems as if the need is not for more credit but for greater selection on the part of lending institutions in extending credit, as well as for interest rates comparable to those paid by other industries. The possibilities of cooperative marketing are great, not so much in cutting down the present costs of marketing as some people believe, but in educating the farmers to produce what the consumers want, in obtaining for the farmers gains from increased bargaining power and in raising the general standard of rural life.

The conclusions drawn from this study can be summarized in a few sentences. The position of agriculture is not as adverse as generally supposed. Many of the causes for the present conditions are due to the past action of the farmers themselves. Remedies for improving the situation or for preventing a recurrence of the problem must come largely from them. The balance between agriculture and other industries in this country is not at all alarming from a social point of view. If past trends continue, it may become a
a serious problem. The national policy should be to maintain the present balance rather than to change it. The best means of accomplishing this end is to reduce or remove the artificial stimuli maintained for encouraging industry and not by directly stimulating agriculture. Aid to agriculture should take the form of educational work directed towards increasing the rural standard of living and not of raising the prices of agricultural products.
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