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The Trend of Corn Prices

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SUMMARY

POST-WAR PERIOD

Since the war, the purchasing power of corn has fallen 25 percent. In terms of 1913 dollars, corn now is worth only 75 percent as much as it was before the war.

The reason for this is that the demand for corn has decreased, while the supply has increased.

The demand has decreased because the number of horses and mules on farms has fallen off 30 percent, owing to the increasing use of trucks and tractors; the number of cattle has decreased 17 percent and the purchasing power of hogs has fallen about 25 percent. The demand for corn from all three of these classes of livestock has therefore been substantially reduced.

On the other hand, the supply of corn has increased. This increase has taken place because of the expansion of the Corn Belt north and west and the reductions that have been made in the cost of producing corn.

OUTLOOK FOR THE FUTURE

The demand for corn for feeding hogs and cattle will probably remain at about its present level for some time.

The number of hogs will probably increase slowly, but if the use of supplemental feeds continues to spread, the demand per hog will be reduced, perhaps enough to offset the effect of an increasing number. The demand for corn for feeding to horses and mules is expected to decrease, because the number of horses and mules on farms is expected to continue to decline with the increasing use of trucks and tractors.

With hogs and cattle taking about as much corn in the future as at the present time, and horses and mules taking less, the total demand for corn is likely to decline slowly in the future.

On the other hand, two or three changes are taking place in the field of corn production which are increasing the supply of corn. One is the continued improvement in methods of corn production, increasing yields and decreasing costs in the central parts of the Corn Belt. Another is the continued expansion of the Corn Belt west and north, due to the development of more drought-resistant and early-maturing varieties of corn, the use of larger implements, and some contraction of wheat acreage in regions where it competes with corn.

If these developments in the recent past continue in the future, the supply of corn will be increasing at the same time that the demand is slowly decreasing. This indicates that the long-time trend of corn purchasing power is likely to move downward.

This, however, does not mean that profits will be adversely affected all over the Corn Belt. The outlook for profits for most Iowa farmers is more encouraging than the outlook for corn purchasing power. Many farmers are so situated that they can continue to increase their efficiency in production and cut their costs of production faster than prices fall. Their profits may be greater, not less, than before.
Since the war, the purchasing power of corn has fallen 25 percent. In terms of 1913 dollars, corn now is worth only 75 percent as much as it was before the war.

A farmer who sells a load of corn today gets about as much money for it as he used to, it is true; but that money will not buy as much of other goods as it would before the war. The price of corn has gone up since the war, but the prices of other things have gone up more than the price of corn; they have gone up 25 percent more. In actual fact, corn now is worth only 75 percent as much as it was before the war. Figure 1 shows the situation in terms of 1913 dollars.

This chart shows that previous to the war the purchasing power of corn had been rising steadily for many years. The population of the United States was growing rapidly, and the livestock industry was expanding in response to the constantly growing demand for food. This in turn resulted in a continual increase in the demand for corn and other feed grains. Settlers poured into the Middlewest, but the demand for corn increased faster than the supply. The trend of corn purchasing power rose steadily from the time of the Civil War to the end of the recent World War, at the rate of about \( \frac{1}{2} \) cent per bushel per year.

Then came the post-war depression, and at one stroke the value of corn at the farm was reduced to 1890 levels. It has stayed there ever since.

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Fig. 1. United States Dec. 1 farm purchasing power of corn, 1866-1929.
That is what has happened in the past. What about the future? Can we look for the purchasing power of corn to recover and perhaps return to pre-war levels within the next few years, or is it more likely to keep on going down? Wheat has fallen to nearly half its pre-war value. Is there any danger of corn doing the same?

These are questions requiring the most thoughtful consideration, for upon them in large measure depends the welfare of the Corn Belt.

We will deal first with the causes of the present low level of corn purchasing power. That will put us in a better position to look into the future.

**THE POST-WAR DROP IN THE PURCHASING POWER OF CORN**

We must first discover why the purchasing power of corn has fallen 25 percent since the war.

Perhaps the demand for corn has fallen off. It may be that there is less livestock in the country now than there was before the war; or possibly less corn is being fed per head. On the other hand, it may be that the supply of corn has increased. This would pull down the purchasing power per bushel as easily as would a decrease in demand.

Let us look into the demand side of the question first.

**CHANGES IN THE DEMAND FOR CORN**

Livestock consume over 85 percent of the corn crop. This is shown in fig. 2. The first step, then, is to study the different
classes of livestock separately, to see where any reduction in demand may have taken place.

Horses and Mules

Figure 3 shows the recent changes in the numbers of livestock on farms. The chart shows that the number of horses and mules on farms has decreased 30 percent since 1919. This reduction of course is due to their steady displacement by tractors, trucks and automobiles.

This displacement is greater than is generally realized. Census data show that the number of tractors on farms has doubled every five years since 1920. The figures show that in 1920 there were 246,000 tractors on farms in the United States. In 1925 there were 506,000 and in 1929 there were estimated to be 853,000. During this period, that is, from 1920 to 1929, the number of horses and mules on farms decreased by more than 5 million.

Cattle

Figure 3 shows the heavy reduction in the number of cattle; there are 17 percent fewer cattle on farms now than there were in 1918.
Opinion is divided as to whether this reduction was part of a cyclic movement, or was simply the result of liquidation forced upon cattle raisers by the post-war depression. In any case, the decline came to an end in 1929. Since that time, cattle have been increasing in number.

Hogs

Figure 4 shows that since the war the number of hogs on farms has also decreased. The trend thru the cycles turns downward.

The other line on the chart, however, shows that the number of hogs slaughtered in the country as a whole has not decreased. There are fewer hogs on farms, it is true, but they are producing as many hogs for market as the larger number of hogs did before the war.

Of the two series shown in the chart, total hog slaughter is the better measure of the total hog demand for corn. As the chart shows, this hog slaughter has not changed much since the war. The hog demand for corn therefore has not changed since the war on account of changes in hog numbers.

A very important change of a different sort, however, has affected the hog demand for corn; that is the fall in the purchasing power of hogs. Since the war, a great reduction has taken place in hog purchasing power. Figure 5 shows that it
has fallen about 25 percent. A similar decline has taken place in the purchasing power of beef cattle.

This drastic reduction in the purchasing power of hogs, of course, has had a direct depressing influence on the purchasing power of corn. The two are so closely related that changes in one are immediately felt in the other. In this case, the fall in the purchasing power of hogs was the cause, and the drop in the purchasing power of corn was the effect.

The chief reasons for the post-war decline in the purchasing power of corn, then, appear to be three in number.

First, there has been a 30 percent decrease in the number of horses and mules on farms. Second, beef cattle have fallen nearly 20 percent in number altho they have recovered during the last few years to within 17 percent of their number in 1918. Third, a drastic reduction has taken place in the purchasing power of hogs and other meat animals.

**POST-WAR CHANGES IN THE SUPPLY OF CORN**

We have shown the reduction that has taken place in the demand for corn since the war. Changes have also taken place in the supply.

Figure 6 shows that altho the purchasing power of corn has fallen off 25 percent, the production of corn has been reduced only about 5 percent. Corn acreage reached a rounded peak
during 1910 to 1915 at about 105 million acres, and has declined slowly since then until at the present time the average runs at about 100 million acres.

In spite of the reduced purchasing power of corn, therefore, nearly as much corn is being produced as before the reduction took place.

There are several reasons for this. One reason is the cuts that have been made in the cost of producing corn in some parts of the Corn Belt. Large fields and implements are coming into more general use, better varieties of corn are being grown and more modern rotations are being followed.

In some cases standards of living have also been reduced. The fact that corn acreage has expanded in the northwestern part of the Corn Belt in the face of the reduced purchasing power of corn, however, indicates that part of the increase in supply is due to the spread of corn production into new areas where costs of production are lower.

The reasons for the low purchasing power of corn since the war, then, are two. On the one hand, the demand for corn has fallen off. On the other hand, reductions have been made in the cost of producing corn, and this has had the effect of increasing the supply.
THE FUTURE OF CORN PURCHASING POWER

What are the prospects for the trend of corn purchasing power in the future? Is it likely to recover and perhaps return to pre-war levels? Or is it more likely to follow the lead of wheat and go down?

The answer depends first of all upon future changes in the general level of prices. If the general price level moves up or down, it will carry corn prices up or down with it.

The movements of the general price level, however, are almost impossible to foresee. They depend upon so many worldwide factors—future gold production, the distribution of gold, banking policy, increases in the production of goods, tariffs and other political matters—that in this brief study we cannot attempt to deal adequately with the subject. Nor can authorities in that field give us a simple answer. Those who know most about the movements of the general price level are least certain about what is likely to happen.

The difficulty can be partly avoided by dealing with corn purchasing power instead of corn price. This leaves questions concerning the movements of the general level of prices unanswered, but it permits attention to be focused on the factors directly affecting corn.

PROSPECTIVE FUTURE DEMAND FOR CORN

The prospects for the purchasing power of corn in the future depend upon changes in the demand for corn, in turn mainly dependent upon the demand for livestock; it also depends upon future changes in the supply of corn, which are in turn dependent upon changes in corn production practices and other cost factors.

Let us consider the factors affecting the demand first, taking up each of the three main classes of livestock separately.

Horses and Mules

Figure 3 in the preceding section showed that nearly a third of our horses and mules have been displaced since the war by mechanical power in the form of tractors, trucks and automobiles.

This decline will probably continue for some years to come. Agriculture is only part way along the road to mechanization. It seems likely that many more horses and mules will be displaced before their population curve, at present declining so rapidly, begins to flatten out. The January, 1931, figures show no abatement in the rate of decline. The reduction in numbers may be as great during the next 10 years as during the past decade. If it is, it will mean a reduction in the demand for corn of 5 or 6 percent from present levels.
The displacement of horses, however, will begin to slow up eventually. There are many farms better suited to horses than to tractors and trucks, and on these the horse will hold his place.

Cattle

Figure 3 shows that the number of cattle on farms has just passed the low point in what appears to be a cyclic movement with a period of 14 or 15 years. If history repeats itself, the number can be expected to increase for the next five or six years, and decline again for the next few years after that.

The trend thru these movements, however, will probably be horizontal. On the one hand, the per capita consumption of beef is declining to some extent; but on the other, the market for our beef is largely a domestic affair, and our domestic human population is increasing at about 1 percent per year. In the field of dairy products, the demand for milk is increasing, but the efficiency of the average milking cow as a converter of feed is also increasing. All in all, it seems that the result of these conflicting components will be a roughly horizontal trend in the numbers of beef and dairy cattle in the United States.

Whether the trend of the per capita cattle demand for corn will also be horizontal is a further question that is discussed later.

Hogs

The outlook for the hog demand for corn is based fundamentally upon the prospects for the domestic and foreign demand for pork. This, of course, is in itself a subject calling for extended research. The main outlines, however, appear to be as follows:

The export demand for pork products seems to be weakening. Exports of lard are increasing, but those of other pork products are falling off more rapidly than the increase in the exports of lard. The total of all pork products exports, including lard, averaged 1,305,000 pounds for the period 1900-1904; 1,249,000 for the period 1905-1909, and 1,149,000 for the period 1925-1929.

What are the prospects for the domestic demand?

The per capita domestic consumption of pork shows a slight upward trend from 1900 to 1930. This may continue, tho some of the recent increase is due to the relatively high price of pork.
of beef. Lard, however, is increasingly feeling the effects of the competition of vegetable oils and other substitutes.

But the per capita domestic demand for pork products is only one of the factors to be taken into account. The other is the growth in the human population of the United States. This has been the fundamental factor underlying the increase in livestock numbers of all kinds in the past, and will continue to be so in the future.

The outstanding feature of the present population situation is the fact that the traditional growth in our population is now slowing down. The 1940 census is expected to show a deceleration in the rate of population increase ranging from 5 to 8 percent. The birth rate of the United States has fallen 25 percent in the last 13 years, and is now lower than the birth rate of France. Many leading authorities are convinced that not only the United States but northern Europe will reach a stationary population basis within 35 years.

For the next decade, however, the increase in domestic human population will probably more than offset the effect of declines in export demand for pork products. The total demand for pork products therefore should slowly increase.

Whether this will result in a similar slow upward trend in the hog demand for corn depends upon future changes in hog feeding methods and hog rations. Within the past 20 years, supplemental feeds, as tankage and fishmeal, have been coming into more general use. This has reduced the amount of corn needed for hog feeding; less corn is required to produce 100 pounds of gain when supplements are used in the ration.

If the use of supplemental feeds continues to increase, it will continue to displace some of the hog demand for corn. Thus, even tho the human demand for pork should slowly increase in the future, the total hog demand for corn in the United States may not increase with it. Taking everything into account, it is probable that the total hog demand for corn in the future will remain at about its present level.

**Competition from Other Grains**

One more important factor affecting the demand for corn is the prospective competition from other grains.

The substitution of wheat for corn in feeding that took place in 1930 and the early part of 1931 is not likely to continue, once adjustment has been made between wheat and corn prices and production. In spite of recent cuts in the cost of production of wheat, over a period of years it will probably cost more to produce wheat than corn. Shifts in production at the overlapping margins between wheat and corn areas will be made, but they will affect the supply of corn, not the demand for it.
The competition from grain sorghums, oats and barley is likely to have more effect upon the demand for corn than from wheat. Not enough data are at hand, however, to enable this competition to be statistically estimated.

PROSPECTIVE FUTURE SUPPLY OF CORN

The final question is the probable future supply of corn. The cost of corn production is the main factor involved, and several conflicting forces are affecting it.

Mechanization of the Corn Belt

The first force is the continued improvement being made in technical methods of production. Larger farm implements, such as two and four-row cultivators and mechanical corn pickers; the application of more fertilizer; the use of larger fields, proper rotations and hybrid seed; the development of surfaced roads and motor trucks—all these changes are reducing costs or increasing yields, and thereby increasing the supply of corn.

Is the reduction in the costs of producing corn likely to continue in the future, or has it already begun to reach its limits? The experience of the Wheat Belt throws some light on this question. Wheat combines have been in successful operation for 40 or 50 years, but they have come into general use and begun to exert their full force upon wheat production methods and costs only within the last 5 or 10 years.

In the first stage of the application of a new implement to agriculture, the attempt is made to adapt it to the existing size of the average farm, which is determined mainly by the nature of the implement previously used. In the second stage, enough inertia has been overcome that instead of adapting the new implement to the old size farm, the size of the farm is adapted to the new implement, which only then is able to exert its full effect. This second stage has now been entered in the wheat belt, under the influence of the combine; the average size of 100 representative farms selected for study in Montana, for example, has increased, with the general use of the combine, from 600 tilled acres in 1924 to 1,200 acres in 1929.

Perhaps the general adoption of the combine was held back until efficient tractor and combine motors had been designed and manufactured on a commercial scale. It may not take as long now for power machinery to be generally adopted in the Corn Belt. On the other hand, perhaps the retarding factor in the case of the combine was the inertia of established farming practices; if that were true of the combine in the Wheat Belt, the adoption of power machinery in the Corn Belt may take as long as did the adoption of the combine.

In any case the Corn Belt is still in the first stage of mechan-
The present application of the general-purpose tractor appears to be an attempt to fit the new machinery into the old horse-farm practice. The first mechanical corn pickers were one-row machines, although two-row implements are more efficient; but these require larger fields than the average at the present time.

There are signs that the second stage, that of changing the size of the farm to fit the new power machinery, is upon the Corn Belt horizon, but it is not yet here. The average size of Iowa farms has shown only a very slight increase in the last few years, as Table I shows.4

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</tr>
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<td>1928</td>
<td>163.6</td>
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The effect of mechanization in the Corn Belt may be exerted only upon farm practices and not upon farm acreage. This, however, is not likely. Four-row planters and cultivators and two-row corn pickers require a larger farm than one of 160 acres in order to reach their maximum efficiency. The corn combine, too, if it is found practicable, would require a farm larger than the present average size for its most profitable operation. The conclusion must be that the Corn Belt is only part way into the stage of mechanization.

It is possible that we shall see further specialization within the Corn Belt according to the topography of the land. Farms in level areas laid out in large fields would be able to specialize on the production of grain for the smaller livestock farms in adjacent rougher areas where large implements could not well be used. This may involve a considerable amount of farm reorganization.

The Corn Borer

A different force, working against cuts in the cost of producing corn, is the corn borer.

This parasite is steadily spreading westward through the Corn Belt. It has already made its appearance in Illinois. It is expected in Iowa within the next three or four years although not in sufficient quantities to do commercial damage; that is not

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4From the “Farm Statistics” tables in the Annual Iowa Yearbooks of Agriculture.
expected to occur until perhaps five years or more from the present.

Iowa farmers thus have five or more years before they need to take this menace into their cost accounts. How great its effect will be remains to be seen; it may be reduced by the use of preventive methods, by the removal of all trash, by deep plowing or other means. Even so, the cost of cleaning up the field is an added item of expense. Perhaps the market for cornstalks for the cornstalk industries may develop enough to offset some of this cost.

Geographical Changes

Another factor is the gradually increasing concentration of corn in the Corn Belt. This has been in progress since the first of the century. The trend of the annual ratios between corn production in the nine Corn Belt states and the 39 other states has increased from 1.28 in 1908 to 1.88 in 1929. This is shown in fig. 7.

Most of this increase, however, is due to the fact that the Corn Belt has moved northwest during the period considered. Since the states used to represent the Corn Belt are those in which corn production is the greatest at the present time (not those in which corn production was the greatest at the beginning of the century) some increase in relative Corn Belt

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5Iowa, Illinois, Indiana, Ohio, Missouri, Nebraska, South Dakota, Minnesota and Wisconsin.
production would be expected from this northwestern move­ment alone.

Evidently the northwestern movement is much more pro­nounced than the tendency toward concentration in the heart of the Corn Belt. It is on the northwestern border than acre­age has expanded since the war; this has taken place in the face of substantial reductions in the purchasing power of corn. The introduction of earlier maturing varieties of corn has probably been the biggest factor behind this northwestern movement, but the use of larger fields and implements, which are well adapted to this territory, has also played its part. This northwestward expansion is likely to continue.

If the prices of wheat and oats continue low in the future, the northwestern movement of the Corn Belt will be acceler­ated. At the margin between corn and the small grains, corn acreage will expand while wheat and perhaps oats acreage will be contracted.

SUMMARY OF OUTLOOK FOR THE PURCHASING POWER OF CORN

A continued reduction in the number of horses and mules may be expected to reduce the demand for corn 4 or 5 per­cent during the next 10 or 15 years.

The trend of the demand for beef will probably remain roughly horizontal, while that for dairy products is likely to increase. This increased demand for dairy products may easily be met by increasing the production per cow, without much if any increase in the total number of dairy cows consuming corn. The demand from all cattle is therefore likely to remain about the same as at present.

The demand for pork will probably increase in the future, but this increase is not likely to be reflected in a commensurate increase in the hog demand for corn. Changes in breeding and feeding practices and in other production methods, and in the spread between retail pork and live hog prices, will affect the closeness with which changes in the demand for pork are re­flected in changes in the hog demand for corn. It is probable that this hog demand for corn will remain roughly at its present level for some years to come.

It appears that the supply of corn is likely to continue to in­crease in the future as it has in the past, owing to continued reduction in the cost of production. Some expansion of corn acreage in response to low prices for oats and wheat is also likely to occur.

The long-time trend of corn purchasing power in the future, then, is likely to move slowly downward.
THE OUTLOOK FOR PROFITS

The prospects are that the trend of the purchasing power of corn will move slowly downward in the future, but this does not mean that profits will be adversely affected all over the Corn Belt. The outlook for profits for most Iowa farmers is more encouraging than the outlook for corn purchasing power.

Many farmers are so situated that they can continue to increase their efficiency in production and cut their costs of production faster than prices fall. Their profits may be greater, not less, than they were before.

The difference between the outlook for prices and for profits is illustrated in the changes that have taken place in the last few years in the Wheat Belt. Prices for wheat have been cut severely due to a decrease in demand and to an increase in supply resulting from the use of the tractor and combine. Yet in areas suited to the new implements, in parts of Kansas, Oklahoma and Texas, wheat growers on large farms have been able to cut their costs almost as much as prices have fallen. They are still able to make some profits and will be able to increase them when demand returns to normal. It is the wheat growers farther east, where the new methods cannot be so well applied, who are in serious difficulties.

The Corn Belt appears to be on the brink of a similar situation. It will probably enter upon it slowly, and it may be years before the full effects of the situation become evident. But the experience of the wheat and cotton belts appears likely to be repeated in the Corn Belt, tho on a less severe scale, when the time is ripe. Those who are in a position to continue to cut the cost of production of corn should be able to preserve their profits—in many cases, to increase them—but those on small rough farms may not.