A Picture of the Grain Industry

BY W. J. SPILLMAN

MARKETING GRAIN
LESSON 1

The American Institute of Agriculture

A PICTURE OF THE GRAIN INDUSTRY

Crop Areas - Buying Areas - Future of the Industry

By W. J. SPILLMAN
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MARKETING GRAIN
LESSON 1

"Every Lesson by a National Authority"

Confidential Edition
Issued for Members

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THE MAN WHO CONDUCTS THIS LESSON

WILLIAM J. SPILLMAN

It seems to be the fashion now-a-days for men's minds to concentrate on individual activities of life. One man's inclination is toward railroading, another is toward dairying, and another is toward mining. It is very apparent that the mind of W. J. Spillman has been very much concentrated on the grain industry.

For several years owning a farm of his own in Missouri, Mr. Spillman has had the practical experience of a farmer in finding the best market for his grain. In 1902, he was a specialist in the Department of Agriculture known as an agrostologist (an agrostologist is one who is a specialist in grains and grasses). His title was changed in 1905 to "agriculturist," and this title he had until 1915, when he became Chief of the Office of Farm Management of the U. S. Department of Agriculture. In this office he was more specifically concerned with the marketing of grain than with production.

In the course of his work in the Department of Agriculture, he prepared many bulletins and supervised the preparation of many others. All of the time his work was kept practical by the fact that he had the practical farm problems of a farm owner to settle almost every day.

The Office of Farm Management was later merged with other departments, and now the work formerly conducted by the Office of Farm Management is conducted by the Bureau of Agricultural Economics, of which Mr. Spillman is a member.

SUMMARY OF WILLIAM J. SPILLMAN'S TRAINING AND EXPERIENCE

EXPERIENCE: Consulting Specialist, Bureau of Agricultural Economics, U. S. Department of Agriculture, since 1921

Associate Editor, ''Farm Journal,'' 1918-1921

Chief, Office of Farm Management, U. S. Department of Agriculture, 1915-1918

Agriculturist, U. S. Department of Agriculture, 1905-1915

Agrostologist, U. S. Department of Agriculture, 1902-1905

Professor of Agriculture, Washington State College, 1894-1901

Professor of Science, Oregon State Normal, 1891-94; Vincennes, 1889-91; Missouri State Normal, 1887-89

Fellow, A. A. A. S.

President, American Farm Management Association

MEMBER: National Academy of Science; Society for the Promotion of Agricultural Science; American Society of Agronomy; American Genetic Association

AUTHOR: ''Farm Grasses of the United States''; ''Farm Science''; also various bulletins on agricultural subjects; contributor to scientific journals; editor, heredity section, ''American Naturalist,'' 1908-15

EDUCATION: B. S., University of Missouri, 1896; M. S., University of Missouri, 1889; D. Sc., Temple University, Philadelphia, 1907

HOW TO STUDY THIS LESSON

You may not have realized that the grain industry is so huge and complicated as it is, unless you already know most of the facts in this lesson. From the study outline, you will see that there are 11 parts, but do not be misled by this number. A separate part is devoted to each of the grains, and that is why so many divisions are made.

First, Master Part I

Part I is, in a way, a review of some of the things you learned in Lesson A, but with these facts applied specifically to the grain industry.

Second, Familiarize Yourself with Wheat

Part II is devoted to the world's most important bread crop--wheat. While wheat is not the largest crop in the United States, it is of more importance in world commerce than any of our other crops. And so you should spend a considerable amount of time on Part II.

Inasmuch as the fluctuation in the price of wheat affects prices of many other farm products, it is particularly important that you know how the crops and the demand in certain foreign coupntries are likely to affect the price of wheat in America.

When you have thoroughly mastered Part II, you will be able to explain just what competition we have in the world's wheat markets.

Third, Familiarize Yourself with Our Largest Crop

Part III is also exceedingly important, because it deals with the largest crop in the United States —corn. Corn is not so important in the world's commerce as wheat because a much smaller amount is moved from one country to another. Much the larger percentage of corn is consumed right where it is produced. And so you should be sure to have clear when you finish with Part III the entire situation of corn production and marketing in the United States.

Fourth, Study Parts IV to VII

Part IV treats of oats, and oats are somewhat similar to corn in that they do not enter into world commerce nearly so much as wheat. Foreign production of oats is not nearly so important as home production. And so you should pay particular attention to the facts given in Part IV about the production and marketing of oats in America.

Practically the same thing is true of barley, treated in Part V; rye, treated in Part VI; and buckwheat, treated in Part VII.

Fifth, Study the Flax Section

There is one little paragraph in Part VIII that is, perhaps, more important than any other. This paragraph has the heading, "The United States Imports Flaxseed." In that paragraph you will learn of the countries from which we buy flaxseed. And you will understand, of course, that it is important to keep informed as to the production of flaxseed in those countries and as to the imports from those countries in order to be able to judge as to the prospective change in price for flaxseed here in America.

Sixth, Study Part IX on Rice

Rice is one of the least important crops in America. However, there are many interesting facts in Part IX which treats not only of American production, but also of production in other parts of the world. One of the important facts to remember in this part is concerned with the consumption of rice. If you understand where rice is needed and where it is produced, you will be able to judge as to the probable future of rice growing in America.

Seventh, Master Part X

Do not slight Part X, because it gives you the beginning of a great deal of knowledge you will acquire in this course regarding the specific methods used in marketing grain.

Eighth, Learn the Eating Habits of Nations

Part XI provides you with the information that is so essential to understand in marketing of grain; that is, the eating habits of the various nations. A knowledge of the consumption of the various grains

in various parts of the world is exceedingly important, and after you have gone farther with the course, you will appreciate this more than you do now. That is why you are warned to familarize yourself thoroughly with Part XI.

Spend Four Study Periods on This Lesson

You will probably accomplish most by attempting to master Parts I and II first. Part I ought to be easy, because it is little more tha na review. But Part II will require more time. Certainly you ought not to spend less than an hour on these two parts.

Probably you will find it better to consider together Parts III to IX inclusive. But it may be difficult to master all of these parts in one study period. The chances are, you will find it best to study all of them together for two study periods. That is, get all you can the first hour, and then finish the work in the second period.

You ought to be able to master Parts X and XI in one period, because both of those parts are short. However, don't overlook the fact that both of them contain a great deal of very valuable information.

How to Make Paper and Pencil Help You

Use your paper and pencil in studying this lesson. Tabulate the figures here contained in different ways in an effort to make the situation more clear to yourself, and also to make it eaiser for you to remember the various facts.

Many students find it of great value to write short compositions on various phases of each lesson. If you want to attempt to do that ,it would be a good idea to write one composition on Part I; another, on Part II; one on Part III; one on Parts IV, V, VI, and VII taken together; one on Part VIII; one on Part IX; one on Part X; and one on Part XI.

There probably will be no good use you could make of these compositions after they are finished, but the value you will get from writing them is that the facts will be more firmly fixed in your mind than if you have not written what you have learned. Do not send these compositions to the Institute.

In writing such compositions, be sure to avoid using the same expressions found in the lesson. Use your own words always.

STUDY OUTLINE

A Picture of the Grain Industry

PART I

PART II

PART III

STUDY OUTLINE—(Continued)

PART IV

PART V

PART VI

PART VII

PART VIII

STUDY OUTLINE—(Continued)

PART IX

PART X

PART XI

INTRODUCTION TO LESSON 1

With the background you have secured by mastering Lessons A and B, you are prepared to proceed with the details of handling the marketing of grain.

You learned in Lesson A of the various services that are commonly performed upon farm products as they pass from producer to consumer. In Lesson B you learned of the men who perform those services. And now, in this lesson, you will get a very definite understanding of the present situation in the marketing of grain.

Be sure to keep in mind what you have already learned as you study each page of this lesson.

A PICTURE OF THE GRAIN INDUSTRY

Crop Areas - Buying Areas - Future of the Industry

By W. J. SPILLMAN

Since grain is an article of world commerce, it is difficult to understand the grain industry of any one country without a general knowledge of the grain industry of the world. This lesson will, therefore, attempt to give a general picture of the world industry, followed by a more detailed presentation for this country.

PART I.

THE SEVEN CROP PRODUCTION AREAS

There are seven general regions in the world, four in the Old World, and three in the New, in which the rainfall is sufficient to permit the development of agriculture on an important scale. These are as follows: (Refer to the world may, Fig. 1, in Lesson A.)

1. From the standpoint of world agriculture, by far the most important American rainfall area consists of that portion of the United States and Canada lying east of about the hundredth meridian. At present this area is less important than the one in Europe, but the two areas have about equal possibilities, and it will not be many generations until they will be equally important. The more southern situation of this area as compared with the European, makes it the great corn growing center of the world.

2. The southeastern part of Asia, and the islands adjacent thereto, make up the great rice producing area. This includes most of India, Siam, Cochin China, China, Japan, Sumatra, the Philippines, and numerous smaller islands, Java and Borneo.

Rice is the dominant grain in this region, and takes the place largely of the bread making grains. This is the so-called monsoon area of southeastern Asia, and the heavy rainfall in many localities is due to the general prevalence during the warm half of the year of extensive wind currents from the warm ocean waters to the south and east toward the interior of Asia.

In part of the area, the rainfall is so heavy as to interfere with farming and some crops cannot be grown.

3. The third area, and by far the most important Old World production area from our standpoint, lies in western Europe and includes all of Europe except parts of Russia, Finland, Spain, and Norway. Here the great mass of the bread eating (Caucasian) races is concentrated.

This entire region is so densely populated that its agricultural production is far less than is required to meet its needs. For this reason, by far the greater part of the grains that enter into world commerce are sent to this region from the less populous producing areas.

4. The most extensive region of heavy rainfall, and the region of heaviest rainfall, in the New World, covers all of northern and eastern South America as far south as northeastern Argentina, its center of heaviest rainfall being the Amazon Valley, where occurs the largest region in the world with rainfall of more than 80 inches a year. The southern extension of this region in Argentina is an important grain producing region, and because of its small population, is one of the most important grain exporting regions in the world. A northern extension of this area covers Panama, Central America, and part of Southern Mexico.

5. New Zealand and the eastern and southern coasts of Australia make up the fifth area. Although

commerce, especially in dairy products. Taking New Zealand and Australia together, and comparing them with the nations of the world, they stand seventh in butter production, fourth in butter exports, and fifth in exports of cheese (1909-13 figures).

6. The sixth area of sufficient rainfall lies in equatorial Africa, south of the great Sahara Desert. The tropical climate of this region has hitherto prevented the development of an important agriculture here. A part of the area has an over-supply of rain.

7. The seventh rainfall area consists of a narrow strip of land along the western margin of North America from Southern California to Alaska. A very narrow strip occurs also along the southern part of the coast of Chile in South America.

Relative Importance of the Seven Areas

Two of these seven areas (the African and the South American) and part of a third (Asian) lie in the tropics, and in parts of these sections rainfall is too heavy for the best development of agriculture and the industries. Their possibilities are a matter largely for the future, although enormous amounts of human food and of useful fibres are obtained from them. The grain of these regions is principally rice. The possibilities in the way of the production of sugar, cocoanuts, bananas, and numerous other tropical fruits have hardly been touched.

The three areas lying in the north temperate zone, and part of the southeastern Asian area, have from time immemorial been the home of civilized man. It is here that human population is largely concentrated, and both agriculture and the manufacturing and transportation industries have had their greatest development.

Regions of Dense Population

The human population of the world is largely concentrated in three of the great rainfall areas men-

tioned above. By far the greatest number of people live in the Asiatic rainfall area, in which there are five more or less distinct centers of population, namely, India, China, Japan, Korea (Chosen), and Java. This is the great rice eating population of the world. No bread is used by most of these people.

Europe, the World's Greatest Buying Area

The second center of world population is the European rainfall area. Caucasian civilization originated along the eastern edge of this area, and has had its most marked development in the western portion of the area. From this center it has radiated to all parts of the world. The population of this area far exceeds its food producing possibilities, and so food and raw materials for the industries are brought hither from all parts of the world. In fact, the greater portion of world commerce consists in transporting food and raw materials to this region and carrying the products of industry from it to other parts of the world.

Eastern North America, the World's Greatest Producing Area

The third great center of population is the rainfall area of eastern North America. This region is not so densely populated as the two mentioned previously, and has for more than two centuries been the principal outlet for emigration from the other two areas of dense population.

The expansion of agriculture in this region during the past century has been one of the most remarkable phenomena in the history of the human race. It has far exceeded the growth in population in that area, for which reason it became the most important center in the world from which human food is exported. Its cotton is also the most important source of fibre in the world. But this agricultural expansion has already reached the point where its rate is very

materially checked. At the same time, the population goes on increasing, so that the surplus for shipment to other parts of the world is diminishing, and in time may largely disappear.

How Rainfall Influences Production

The rainfall regions along the western margin of the American continents, particularly North America, are new, and their possibilities as yet are hardly touched.

The southern portion of the rainfall area of eastern South America and all of the Australian and New Zealand rainfall areas are important agricultural regions with relatively small population and hence are important regions for production of human food for export.

It is thus seen that rainfall and other elements of climate, particularly temperature, are at the foundation of agriculture and industry and that the distribution of rainfall and population over the earth are dominant factors in determining the course and character of world commerce.

Table I. Comparative Importance of Various Grains

The world's seven most important grains, in the order of quantity produced, are: (based on 1909-13 figures)

1. Wheat
2. Corn
3. Rice
4. Oats
5. Rye
6. Barley
7. Flax
8. Buckwheat

This order is different, however, for the United States, the order of production being as follows: (based on 1909-13 figures)

1. Corn
2. Wheat
3. Oats
4. Barley
5. Rye
6. Rice
7. Buckwheat
8. Flax

From the standpoint of the amount exported from the United States, the order of amounts is as follows: (based on 1909-13 figures)

1. Wheat
2. Corn
3. Barley
4. Oats
5. Rye
6. Rice

Part II.

WHEAT, THE WORLD'S MOST IMPORTANT BREAD CROP

There are three important wheat producing regions in the Old World and three in the New World.

The most important of all, is the region extending from southern Russia westward along the northern border of the Caspian, Black, and Mediterranean Seas to the Atlantic Ocean. It includes a small portion of northern Africa and has an extension of considerable importance eastward into Siberia.

Western Europe the Biggest Producer, Yet the Heaviest Buyer

More wheat is produced in this area than in any of the other areas, but only the eastern half of it produces a surplus, the western half of this area being the most important wheat importing region in the world. It not only buys the wheat from the eastern portion of this area, but it imports most of the surplus from all the other important wheat areas in the world.

The countries in this area that produce a surplus of wheat (or rather did before the World War) are: Russia, Roumania, Bulgaria, and Hungary. Other important European wheat producing nations are: France, Italy, Germany, Spain, and England. But all of these, except Spain, are large importers, and Spain imports a small quantity. Belgium and the Netherlands also import most of the wheat their enormous populations consume. The same is true of Switzerland.

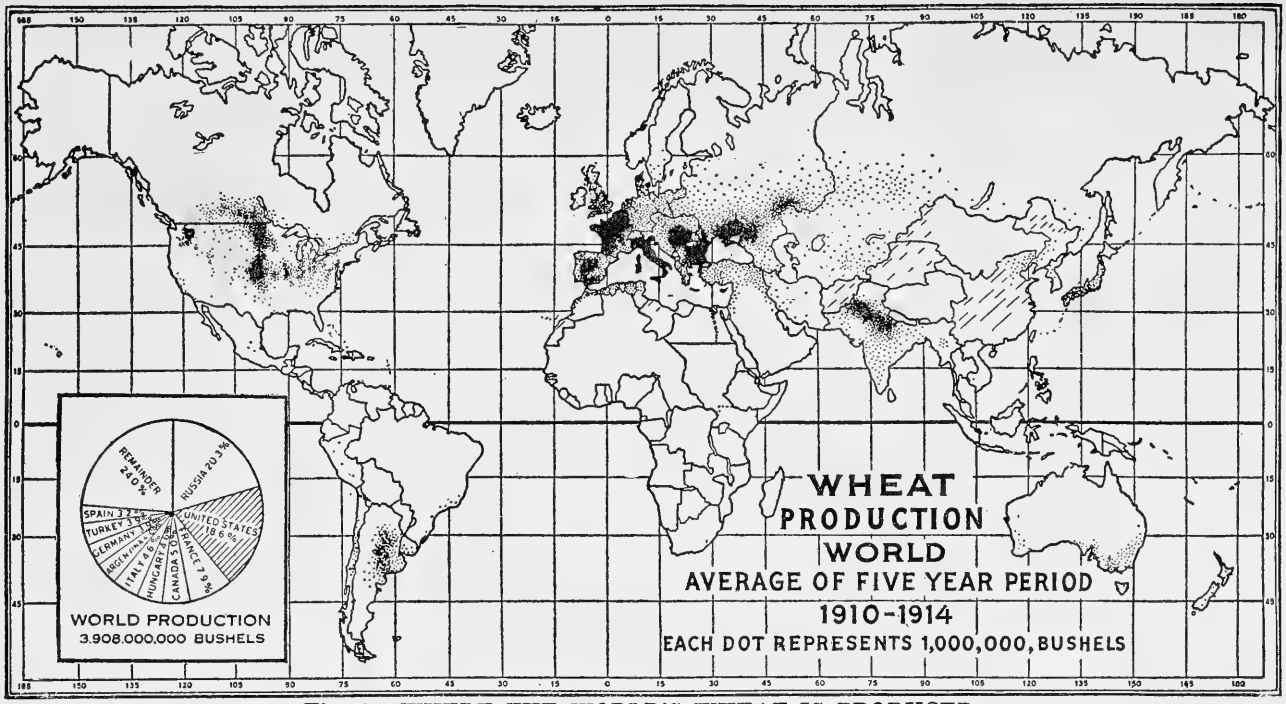


Fig. 1. WHERE THE WORLD'S WHEAT IS PRODUCED

Notice in the circle that the United States produces nearly 19% of the total wheat. Notice also how prevalent wheat growing is in nearly all of Europe. Compare this situation with the fact that the United States exports more wheat to Europe (1922) than to any other nation.

India Produces the Third Most Wheat

The next most important Old World wheat producing area is central and northwestern India. India is the third most important wheat producing country in the world. The population lives largely on rice and a considerable proportion of the wheat is exported.

Australia Exports Much Wheat

The third Old World wheat producing area is Australia. Around the southeastern margin of this island continent is a narrow strip of land eminently adapted to wheat production. The population being small, about 60% of the wheat produced is exported, thus making Australia one of the important exporting countries, although its production is only one-eighth that of the United States.

There is a small amount of wheat produced in Japan and Manchuria, but it is consumed locally, and there is no important commerce in wheat between this region and other parts of the world, although some flour and wheat are imported from western North America.

Central North America, the World's Second Wheat Area

In the New World, by far the most important wheat producing area is in central North America along the western margin of the eastern rainfall area of that continent. This area extends northward into Canada, southward into northern Texas, and in middle latitude, eastward to the Atlantic Coast.

Next to the great European wheat area, this is the most important in the world. As already stated, the production is here greater than the needs of the population, and much of the grain is exported, although by far the greater quantity of it is simply moved from the center of the continent to the region immediately eastward.

The Columbia River Basin of the Pacific Northwest is another small but important wheat producing

region. Formerly, much wheat was produced in the Willamette Valley of Oregon and in the central basin of California, but the crop is less important there now than it was a quarter of a century ago, largely because of the development of more intensive forms of agriculture.

Argentina Exports Over 60% of Her Wheat

The third of the American wheat producing areas is in Argentina. While the amount of wheat produced here is less than one-fourth of that produced in the United States, the export of wheat is nearly equal to that of the United States, constituting 60.5% of the total production, while our exports (for 1909-13) were only 14.3% of our production.

The United States Leads the World in Wheat

Producing and exporting more than any other nation, (now that Russia is producing little) the United States is easily the leader of the world in wheat. It may be surprising to many to know that wheat is not the largest crop in the United States, however. It is exceeded in number of bushels produced by corn.

Practically all of the world's exported wheat is sent to Europe, the largest amount being taken by the United Kingdom. The second largest amount is imported by Germany, the third largest by the Netherlands, and the fourth largest amount is taken by Belgium.

So you see, America's principal export wheat market is represented by the United Kingdom, Germany, the Netherlands, and Belgium. There are some other countries that buy from us, but they also are largely in western Europe.

Our present competition in selling to Europe is mainly from Argentina, Canada, and India.

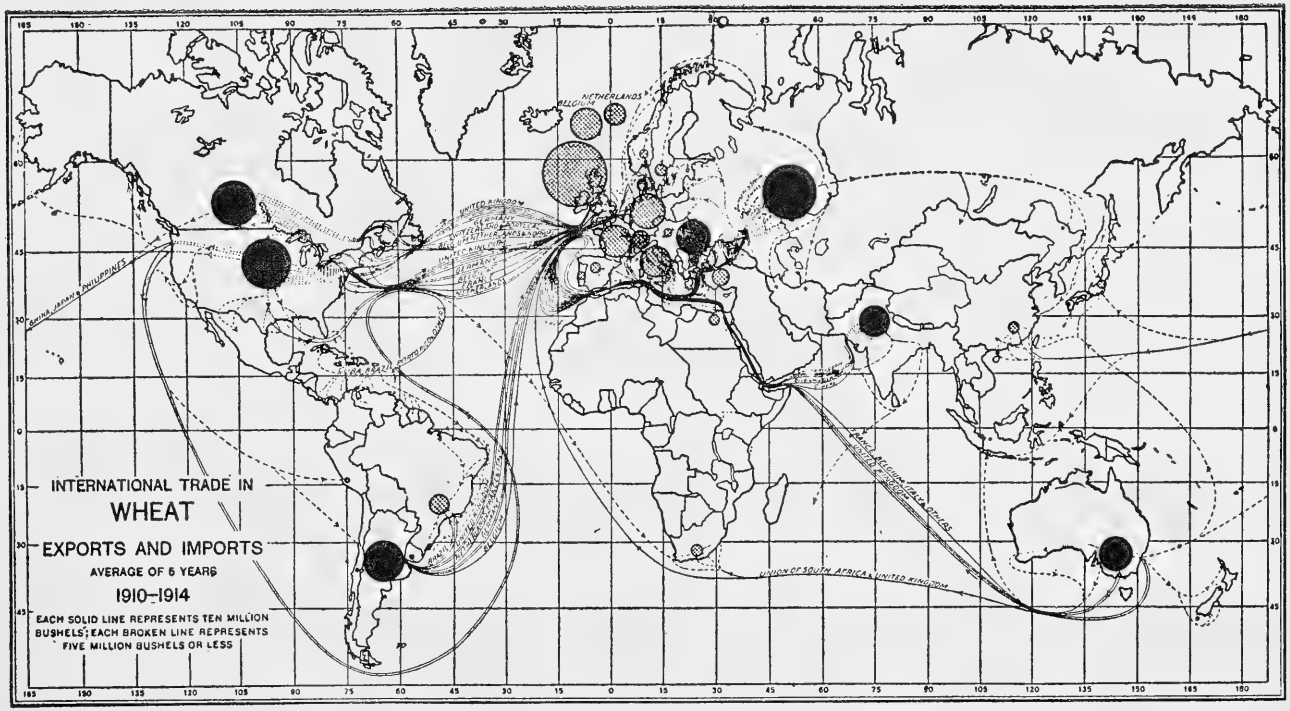


Fig. 2. EXPORTS OF WHEAT BEFORE THE WORLD WAR

The black circles indicate extent of surplus production or exports from the countries where the circles are located. The shaded circles indicate extent of imports. Compare this map with Figure 3

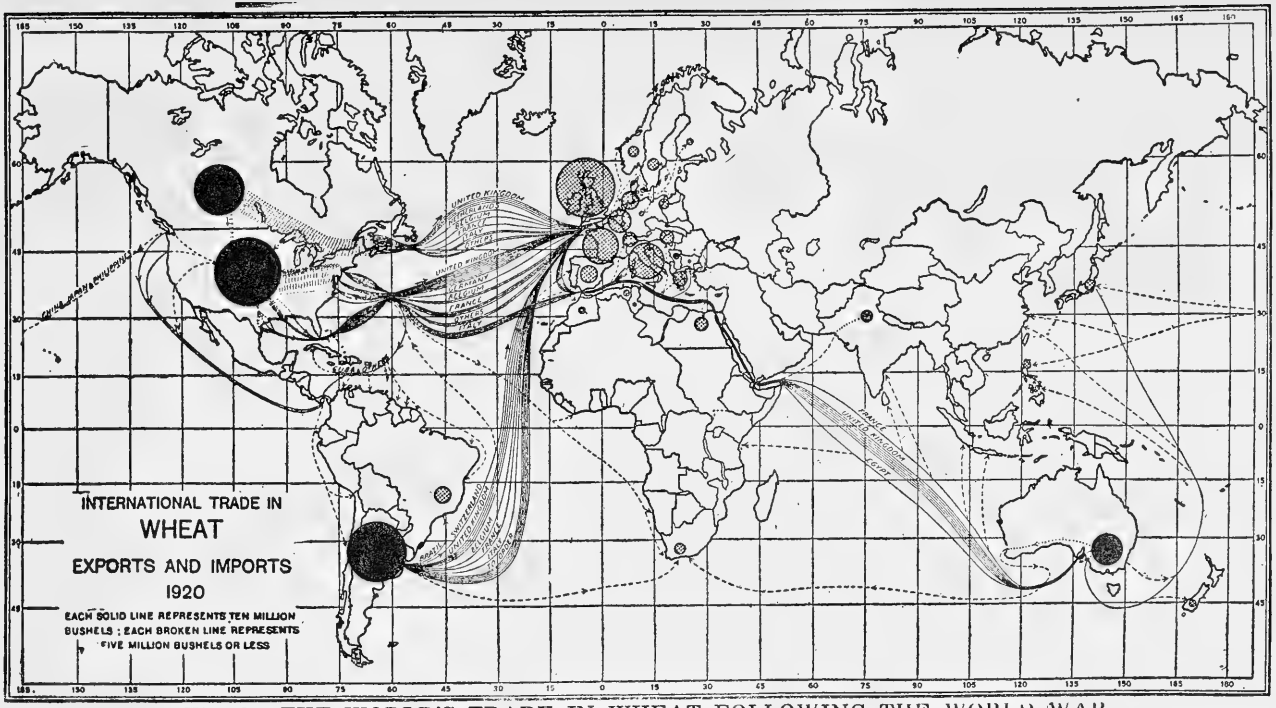


Fig. 3. THE WORLD'S TRADE IN WHEAT FOLLOWING THE WORLD WAR

Notice that the black circles representing American exports have become enlarged, whereas those in the Old World have grown smaller, and in some cases, particularly Russia, have entirely disappeared.. Compare this map with Figure 2

How the World War Affected the Commerce in Wheat

The principal effect of the European War upon the wheat industry was the entire elimination of Russia from world commerce. During the period immediately preceding the war, Russia and Siberia together exported an annual average of 162 million bushels of wheat, 31% of their entire production. There was also a very large decrease in production in Roumania and in France, and a smaller decrease in Hungary, Bulgaria, and Italy. England greatly increased her production of wheat, but is now back practically to normal production.

In time, all these nations, with the possible exception of Russia, should resume their normal relation to the wheat industry. In fact, most of them have already largely done so. The future of the Russian situation is so uncertain that discussion of it would not be fruitful. It is possible that for a generation or more, Russia may remain segregated from the rest of the world's commerce, although there are also possibilities that she may, within that time, resume production and export.

Table II. Rank of Nations in Wheat (Based on 1909-13 figures)

Production	Exports	Imports
1. United States	1. Russia (pre-war)	1. United Kingdom
2. Russia (pre-war)	2. United States	2. Germany
3. British India	3. Argentina	3. Netherlands
4. France	4. Canada	4. Belgium
5. Austria-Hungary	5. Netherlands	
6. Canada	6. Roumania	
	7. India	

Competition With North American Wheat Will Decrease

Practically all but two of the great wheat producing areas of the world have been developed approxi-

mately to the extent of their possibilities. These two are Canada and the United States. (This leaves Russia out of consideration.)

Argentina in 1910-11 grew 14,514,000 acres of wheat. Her crop for 1920-21 was 14,817,000 acres. Her maximum, however, during the World War was 17,875,000 acres. The production of wheat in Argentina will probably not increase materially in the future, but the population there is increasing rapidly, so that the export of wheat from that country will probably decrease rather than increase during the next generation.

The wheat area in Australia in 1910-11 was 7,372,000 acres; in 1919-20, it was 6,396,000. The maximum acreage during the World War was 12,845,000 acres.

There is little possibility of any further great extension of the wheat area in Australia and, as the population there is increasing, the export of wheat from Australia should be a less important factor in world commerce in future than it has been in the past.

Canada Destined to Lead the World in Wheat

The story of Canada is quite different. The average acreage of wheat in Canada in the years 1907-10 was 7,420,000. In 1911-15 it was 11,700,000 and in 1916-20, 16,970,000. It is claimed by some enthusiastic agricultural authorities in Canada that that country has 250 million acres of possible wheat land not yet put into cultivation. This is equal to the present total wheat acreage of the world.

It is very doubtful whether this enthusiastic claim is fully justified, but even if there is one-fifth of this area still available, there is little possibility of a shortage in wheat production for one or two generations to come.

How the United States Has Increased in Wheat Acreage

The following table shows the gradual increase in wheat acreage in the United States since 1866. There is only one check in the gradual and rapid increase and that occurred during the period of low prices in the latter part of the eighties.

During the World War, under the influence of patriotic propaganda, the wheat acreage in this country rose in 1919 to the unprecedented figure of 75,694,000 acres. This great increase unbalanced the agriculture of the country very seriously and we have now returned approximately to the normal acreage for our present period of development.

Table III. WHEAT ACREAGE IN THE UNITED STATES
5-YEAR ANNUAL AVERAGES

Periods	:	Thousands of Acres
1866 - 1870	:	18,076
1871 - 1875	:	22,864
1876 - 1880	:	31,886
1881 - 1885	:	36,979
1886 - 1890	:	35,882
1891 - 1895	:	39,117
1896 - 1900	:	48,989
1901 - 1905	:	50,194
1906 - 1910	:	45,766
1911 - 1915	:	51,910
1916 - 1920	:	58,685

It is not possible to say just what the future wheat acreage of the country may be. The figures in the table, as they stand, do not indicate the near approach of a check in the increase of acreage, yet well informed agriculturists are of the opinion that we are approaching an era when this expansion of acreage can not continue, at least at its present rate.

Why Low Prices May Be Expected for Wheat

Certain possibilities of acreage expansion for wheat in Canada, and the probable possibility of considerable further expansion in this country, justify the assertion that for a good many years to come, the world's possibilities of wheat production will exceed the world's requirements for this cereal. We may, therefore, expect in the future occasional over-production and low prices for wheat.

Fluctuation in production of wheat is accentuated by the fact that approximately one-half of the wheat area of the world is grown with less than 30 inches of rainfall. In all regions with rainfall so low as this, periods of exceptionally light rainfall will occasionally reduce production very materially. Therefore, we may expect to fluctuate between over-production and under-production of wheat for many years to come.

Where Wheat Is Grown in the United States

There is a small area in western New York which has always been an important wheat producing region because the soils of that region are eminently adapted to this crop.

To the south of this in Pennsylvania, New Jersey, Delaware, Maryland, and Virginia, is another region where wheat has always been, and is yet, an important crop. Here, again, we have good wheat soils and very excellent climate for winter wheat, except that the rainfall is rather heavy. In spite of the development of more intensive farming near the great cities of the East, wheat has retained an important place in the agriculture of this region.

The next wheat area westward covers Ohio, Indiana, and Southern Michigan, with outlying districts in Kentucky and Tennessee. The climate is here favorable to winter wheat with the exception of the last two mentioned states where it is rather warm for

this crop. The crop fits in well in the rotation practiced and wheat has been an important crop here since transportation facilities first became available.

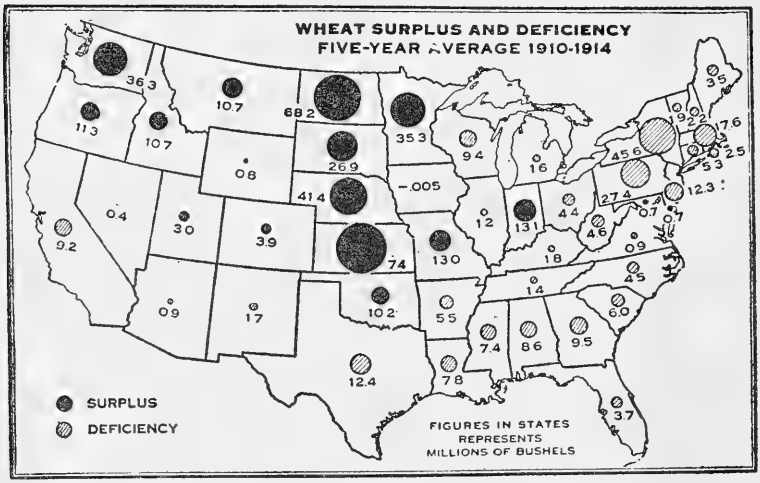


Fig. 4. THE STATES THAT BUY AND SELL WHEAT

Compare this map with Figure 4, and you will see that although Illinois is second in production of wheat, she does not produce enough to meet her own needs. The same thing is true of Ohio

The Central States Grow Winter Wheat

We find a large acreage of wheat in western Illinois and adjacent parts of other states. If the soils of northern Illinois and Iowa were well adapted to winter wheat, it seems certain that this crop would occupy a much more important place than it does in the local agriculture.

An extension of the Illinois wheat area runs up through the Missouri counties flanking the Missouri River. The loess soils along that river are peculiarly adapted to wheat.

The Heart of Winter Wheat Production

The greatest winter wheat area extends from east central Nebraska southward through central Kansas, western Oklahoma, overlapping to a slight extent

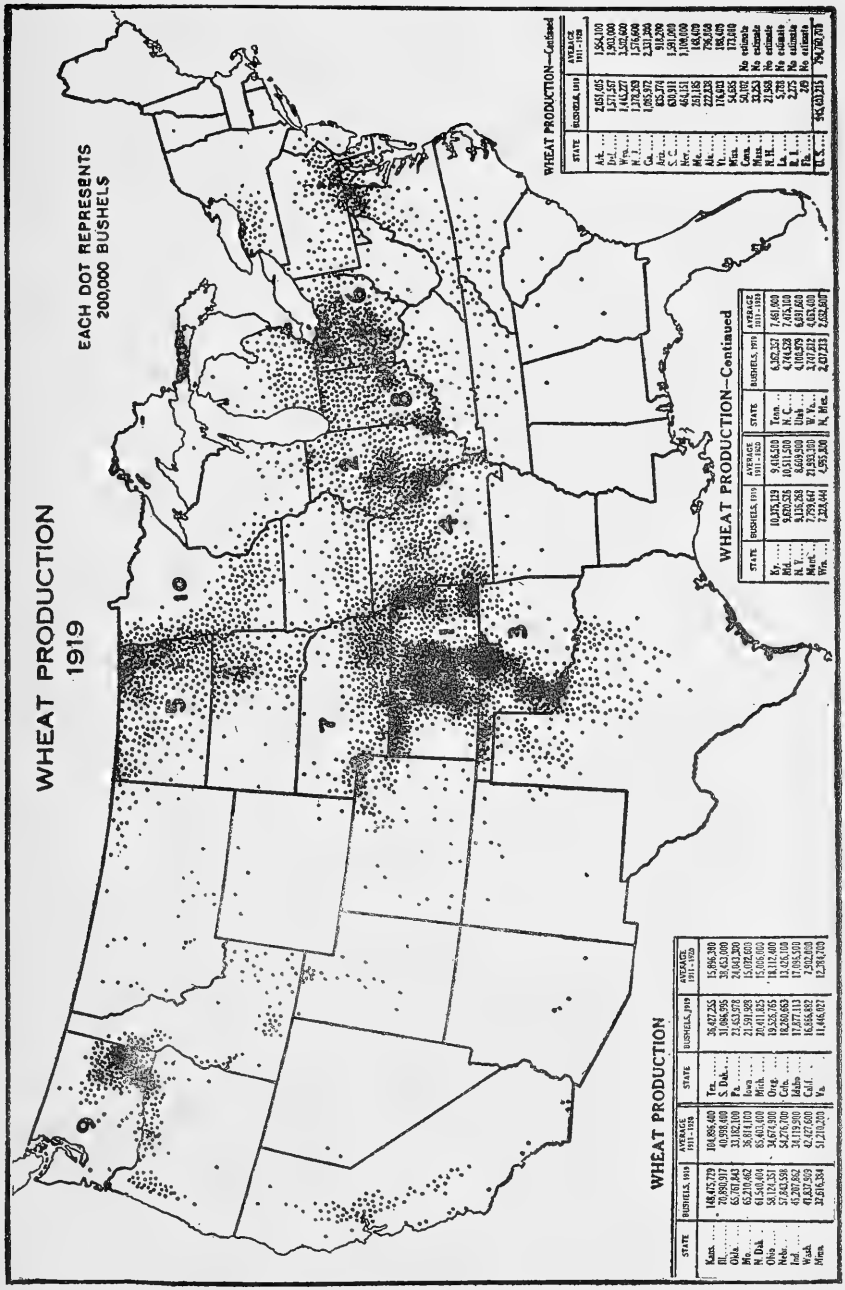


Fig. 5. THE PRINCIPAL WHEAT PRODUCING STATES
Each dot represents the production of 200,000 bushels; the numbers in the states indicate the rank of states in order of production. Compare this map with Figure 5

into northern Texas. Wheat is a dominant crop here largely because the rainfall is somewhat light for corn. The relatively large acreage of oats in this section does not represent commercial production. The oats are needed as a supply crop because of the relatively small acreage of corn.

The One Great Spring Wheat Section

Passing now to the spring wheat country, we find the largest and most important spring wheat region in America in south central Minnesota, extending northwestward, taking in eastern South Dakota, western Minnesota, and practically the whole of North Dakota, with its greatest development in the Red River Valley of North Dakota. The climate here is eminently adapted to spring wheat. Oats are at home and are grown extensively as a supply crop, but most of this region is too far from market for oats as a commercial crop. Flax is an important crop here, as are also barley and rye, for reasons that will be mentioned later.

Finally, we have the limited but important wheat growing region of the Upper Columbia Basin in the Pacific Northwest. About two-thirds of the wheat in this area is fall sown; the remainder being sown in the spring.

Part III.

THE UNITED STATES LEADS THE WORLD IN CORN

There are four important corn growing regions in the world, and a few other regions where the crop is of some importance. First, and by far the greatest, is the central and eastern portion of the United States. This region produces 70% of the entire corn crop of the world. We export only 1.6% of our corn crop, and that goes chiefly to Europe, as do the corn exports of practically all other countries.

Table IV. Rank of Nations in Corn (Based on 1909-13 Figures)

Production	Export	Imports
1. United States	1. Argentina	1. United Kingdom
2. Austria-Hungary	2. United States	2. Germany
3. Argentina	3. Roumania	3. Netherlands
4. Mexico		4. Belgium
5. Roumania		

Most of Our Corn Is Fed to Live Stock

The great bulk of our corn crop is condensed into animal products on the farms where the corn is grown. About 85% of our crop is used in this manner. Only 18% of the crop ever enters commerce as corn, and of this, a large proportion is consumed by farm animals.

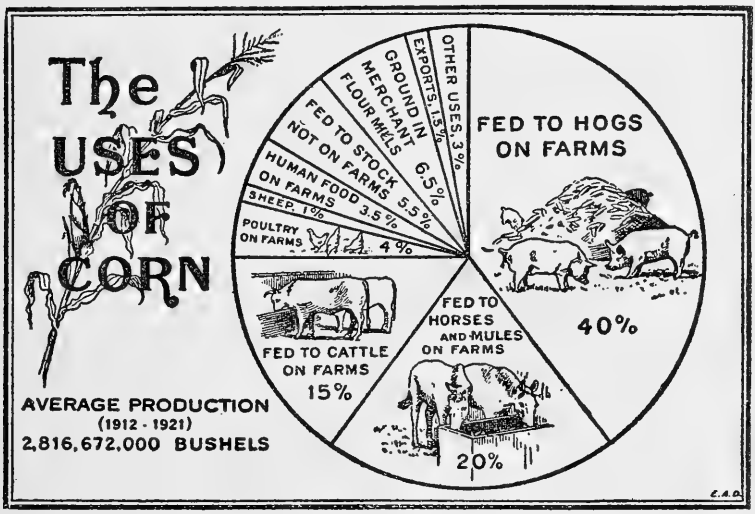


Fig. 6. WHY WE EXPORT LITTLE CORN

From this chart, you will see that most of the corn we produce is fed on farms. Our exports amount to ony 1.5%

Eastern Europe Is Second in Production

The second most important corn region lies to the north and west of the Black Sea and along the northern border of the Mediterranean Sea. In Europe, Hungary, Italy, Roumania, and Russia are the principal

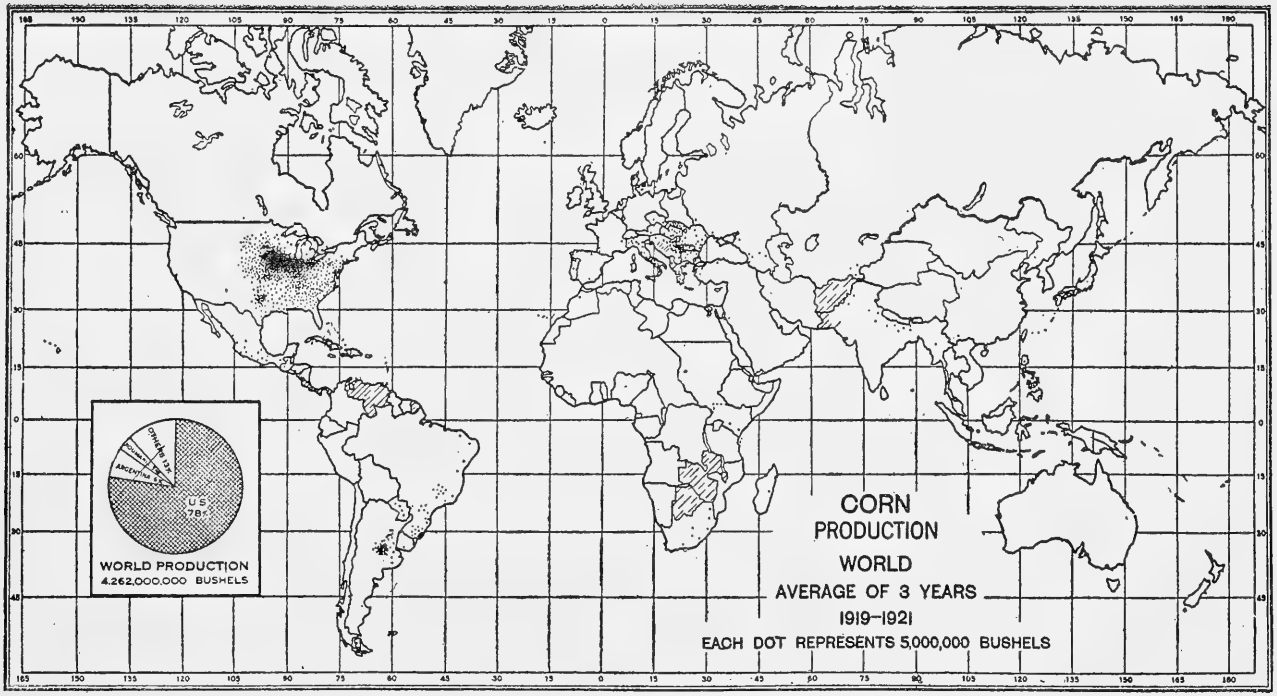


Fig. 7. THE WORLD'S PRODUCTION OF CORN

Notice the circle first, and you will realize why the United States is so important as a corn producer; 78% of the total is grown here

corn producers. Hungary and Italy import corn, but Roumania and Russia export considerable quantities of it. This is mainly because the standard of living of laborers in these countries does not permit them to eat much meat. The other nations of Europe are all importers of corn.

Argentina Is Our Biggest Competitor in Exporting Corn

The third corn area is Argentina. The production of corn in that country is small, averaging 175 million bushels for the five year period from 1909-13; but the population is small, which permits the exportation of 66% of the total production. Argentina exports more corn than any other nation. This exportation to Europe, and occasionally to the United States, is made possible by cheap water transportation and the fact that the corn in Argentina is grown within a short distance of the point of export.

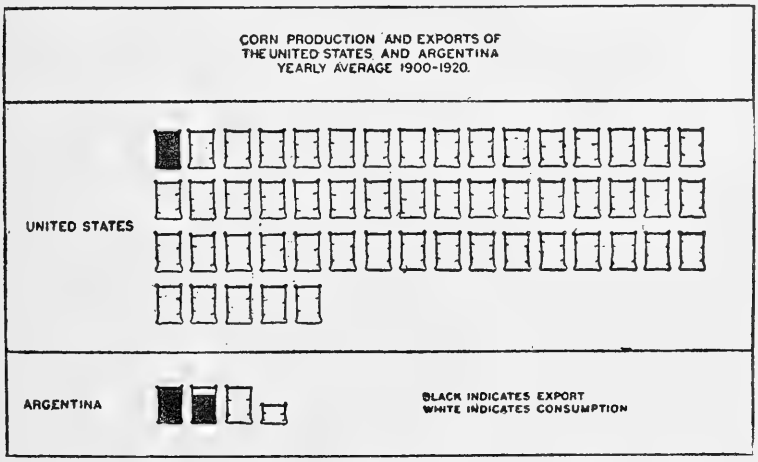


Fig. 8 WHY ARGENTINA OUTSTRIPS US IN CORN EXPORTS
Although we produce many times as much corn as Argentina, we use so much more that our exports (the black bag) are much less than those of the South American country

India a Big Producer, But Not an Exporter

Next in order of corn production is India, the average crop for that country for 1909-13 being 87

million bushels. This corn is practically all consumed locally. India has twice as many cattle as the United States, and more than twice as many human beings, so that that country has need for all its corn.

Small quantities of corn are grown in southeastern and eastern Africa, and along the eastern coast of Australia. Small areas in Egypt and along the northern coast of Africa may be considered as outlyers of the southern European corn region. The only semi-permanent effect of the World War on the commercial corn industry was the elimination of Russia as a factor.

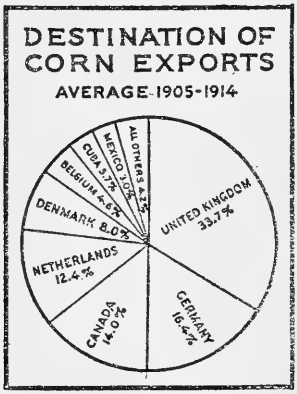


Fig. 9. U. S. EXPORTS

The proportion of corn exports purchased by various countries is here graphically shown

Where Corn Is Grown in the United States

Corn is limited in its distribution northward by temperature and by length of growing season, the line of 66° mean summer temperature corresponding very closely with the northern edge of the corn growing region.

Westward, the acreage of corn is largely limited by rainfall, there being very little corn west of where the mean summer rainfall is eight inches. Most irrigated lands are at too high an altitude for corn, while in the Southwest, alfalfa is a more efficient

producer of forage, and this occupies the major portion of the acreage that might otherwise be devoted to corn.

Throughout the territory to the eastward of the line of eight inches summer rainfall and south of the line of 66° summer temperature, corn is grown almost universally, the heaviest acreage being found in Illinois, Iowa, southeastern South Dakota, eastern Nebraska, central and eastern Kansas, central Oklahoma, western Ohio, and central Indiana.

In other portions of the corn territory, corn frequently occupies a relatively larger proportion of the total crop area than it does in these regions of denser distribution. Throughout this territory corn is mainly a supply crop, being grown for the animals kept on the farm and to supply local markets.

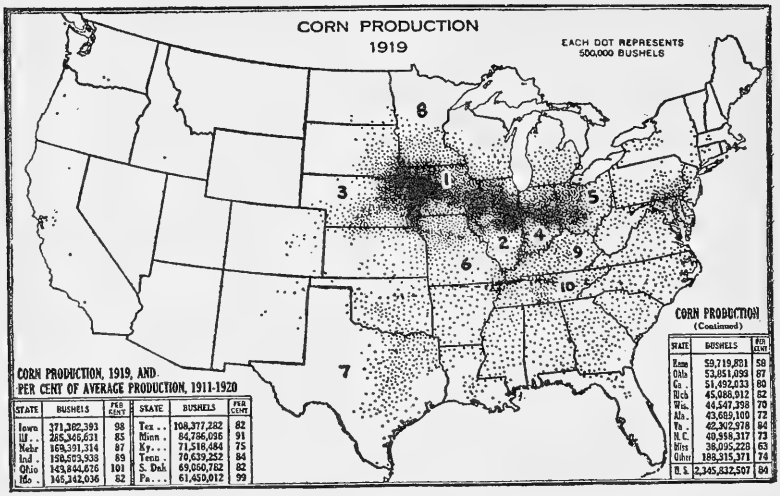
Which Farmers Sell Corn?

The only sections of the country in which any considerable proportion of the crop is marketed is east central Illinois, near the great corn market of Chicago, and in northwestern Iowa and adjoining parts of other states. Sales in other parts of the country are mainly for local markets.

The Fluctuation in the Price of Corn

From 1866 to 1886 there was a rapid increase in corn acreage in this country. Settlement at that time was going on in the western Corn Belt states. But this was a period of falling prices. In 1885 the average price of corn on the farm in December, was only 33 cents, and this fall in price continued until 1896. From 1886 to 1894 the low price of corn prevented further extension of acreage of this crop.

There was, in fact, a large increase in corn acreage in the western portion of the Corn Belt, but there was a corresponding decrease in the eastern portion. Farmers found it more advantageous to devote their land to other crops. When the great panic of the

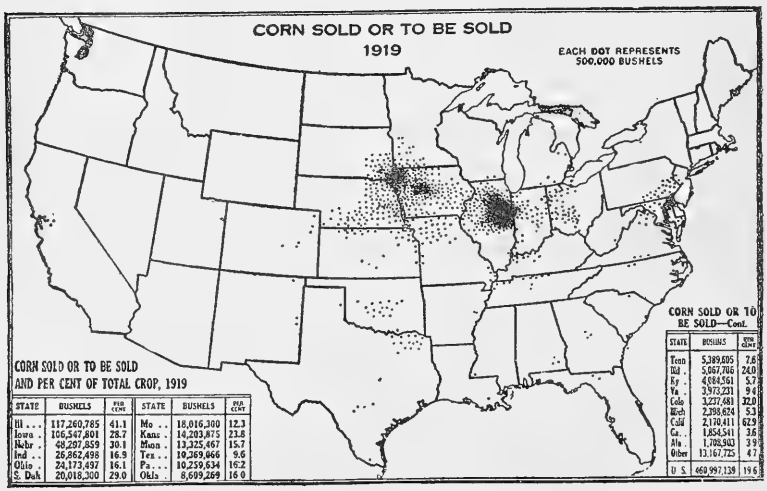


STATE	BUSHELS	PER CENT	STATE	BUSHELS	PER CENT
Iowa	371,382,393	98	Tex . .	108,377,282	82
Ill . .	285,346,631	85	Minn .	84,786,696	91
Nebr .	169,391,314	87	Ky . . .	71,516,484	75
Ind .	150,503,938	89	Tenn .	70,639,252	84
Ohio .	143,844,676	101	S. Dak	69,050,782	82
Mo .	145,142,036	82	Pa . . .	61,450,012	99

STATE	BUSHELS	PER CENT
Kans	59,719,821	58
Okla	53,051,093	87
Ga .	51,492,033	80
Mich	45,088,912	82
Wis.	44,547,398	70
Ala.	43,689,100	72
Va .	42,302,978	84
N. C .	40,956,317	73
Miss	38,095,223	63
Other	188,315,371	74
U. S.	2,345,832,507	84

Fig. 10. RANK OF STATES IN CORN PRODUCTION

Each dot represents the production of 500,000 bushels; the number in the states indicates the order of rank in total production. Compare this with Figure 11



STATE	BUSHELS	PER CENT	STATE	BUSHELS	PER CENT
Ill . . .	117,260,785	41.1	Mo . .	18,016,300	12.3
Iowa .	106,547,801	28.7	Kans .	14,203,875	23.8
Nebr .	48,297,859	30.1	Minn .	13,325,467	15.7
Ind . .	25,862,498	16.9	Tex . .	10,369,666	9.6
Ohio .	24,173,497	16.1	Pa . . .	10,239,634	16.2
S. Dak	20,018,300	29.0	Okla .	8,699,269	16.0

STATE	BUSHELS	PER CENT
Tenn	5,389,605	7.6
Md .	5,067,706	24.0
Ky .	4,084,561	5.7
Va .	3,973,231	9.4
Colo	3,237,681	32.0
Mich	2,398,624	5.3
Calif	2,130,411	62.9
Ga .	1,854,541	3.6
Ala .	1,706,903	3.9
Other	13,167,725	4.7
U. S.	460,997,138	19.6

Fig. 11. ONLY A SMALL AMOUNT OF CORN IS SOLD

By comparing this map with Figure 10, you will see that much more corn is produced than sold. Each dot on this map represents the same number of bushels as in Figure 10

nineties occurred, this advantage disappeared and farmers went back to normal acreage of corn in 1895. From that time onward, the price of corn increased rather rapidly and the increase in acreage was resumed, although at a lower rate than had prevailed in the two decades following the Civil War.

This increase continued to 1912, since which time there has been a slight but rather steady decrease in corn acreage. The large acreage in 1917 was due to the fact that there was an abandonment of 31% of the total winter wheat acreage from winter killing, a considerable proportion of the land thus vacated being planted in corn.

Why Corn Growing Is Likely to be More Profitable

The fact that for the past 10 years corn acreage has remained steady or has decreased slightly, in the face of continually rising prices for corn, is a matter of great significance for corn growers in the United States. We have reached the approximate limit of easily available corn acreage; but the demand for corn and corn products, including beef and pork, goes on increasing as population grows.

It appears safe, therefore, to assume that, except for times of financial depression, corn must be a more profitable crop in the future than it has ever been in the past. And this can not be said with certainty of any other important crop grown in the United States. The corn grower is, therefore, in an exceptionally strong position.

What effect the European corn borer, which, it appears certain, will invade the entire corn country in time, may have upon the profitableness of this crop can not, of course, be ascertained in advance. Indications are, however, that injury from this pest will not be very serious, though its presence will undoubtedly call for some modification in farm practice, particularly in the matter of leaving corn stalks in the field all winter.

Part IV.

THE UNITED STATES LEADS ALL NATIONS IN OATS

There are two great oat growing regions in the Northern Hemisphere, and one small and two very small ones in the Southern Hemisphere. The most important oat region in the world is in Europe, and lies along the northern edge of the European wheat growing region. The crop has its highest development in central Russia, Roumania, Poland, Austria-Hungary, Germany, Denmark, the Netherlands, Belgium, northern France, and the British Isles. The only countries in this area that grow more oats than are needed for home use are Russia and Roumania. The World War eliminated Russia from world commerce. It reduced production in Roumania, but that country will doubtless recover. The United States has the largest acreage of any one country, followed by Russia, Germany, Canada, France, and Austria-Hungary.

The second great oat area lies along the northern edge of the North American wheat growing region in the United States and Canada, both of which countries export small quantities of this grain.

South America Now the Biggest Exporter of Oats

In the Southern Hemisphere, Argentina is the principal producer of oats, although the production of oats there is only 52 million bushels as compared with 1,131 millions in the United States. The small population of Argentina, and cheap water transportation, enables that country to export practically her entire crop. This places her in the position of the world's largest oats exporting nation.

Very small acreages of oats are found in southeastern Africa, southeastern Australia, and in New Zealand. In general, the oat crop of the world, at least in the Northern Hemisphere, is grown under climatic conditions slightly cooler than those best adapted to wheat and corn.

It will be observed that very few countries export any of this crop. Since the elimination of Russia, Argentina stands first in oat exports, the average for the years 1911-13 being slightly greater than the average total production for the years 1909-13. All of the importing nations are in Europe. England, France, Switzerland, Germany, Netherlands, Italy, and Belgium are the leading importing nations.

Table V. Rank of Nations in Oats (Based on 1909-13 figures)

Production	Exports	Imports
1. United States	1. Russia (pre-war)	1. United Kingdom
2. Russia (pre-war)	2. Argentina	2. Netherlands
3. Germany	3. Netherlands	3. Germany
4. Canada	4. Germany	4. France
5. France	5. Canada	
6. Austria-Hungary	6. United States	

Only Four States of the United States Grow Oats Extensively for Market

While oats are widely grown in the United States, they are grown extensively for market only in Minnesota, Wisconsin, Illinois, and Iowa. The large acreage of oats in those states is due in part to the poor adaptability of some of the soil to wheat and its excellent adaptability to oats, but more particularly to the presence of great market centers.

Where Oats Yield the Best

The fact that the western Mountain states produce much larger yields of oats of much greater weight per bushel than other sections of the country, would appear to justify the statement that manufacturers of oatmeal might find it advantageous to locate their mills in that region. They could get their grains more cheaply, of better quality, and the manufactured product would be sufficiently high in price

to make the cost of transportation to other sections of the country a negligible factor. The only difficulty at present apparently is the possible high cost of labor, machinery, building materials, etc.

Part V.

WHERE BARLEY IS GROWN

There are three important barley producing regions in the Old World. The most important of these consists of southern and western Europe, and adjacent portions of the continent of Africa. The second is in northern India. The third is Japan.

In the New World, barley is grown rather extensively along the northern edge of the Corn Belt, particularly in the drier portions to the west; and in the Mountain and Pacific Coast states. There is also a small production in Argentina and Chile.

Barley has never been an important commercial grain in this country aside from its use by the brewing industry. Since the prohibition amendment to the Constitution, its use is limited practically to feeding live stock, in which use it is a substitute for corn.

Table VI. Rank of Nations in Barley (Based on 1909-13 figures)

Production	Exports	Imports
1. Russia	1. Russia	1. Germany
2. United States	2. Netherlands	2. United Kingdom
3. Germany	3. Austria-Hungary	3. Netherlands
4. Austria-Hungary	4. India	4. Belgium
5. Japan	5. Roumania	
6. Spain	6. United States	

Corn, oats, and barley are widely substituted for each other in growing or maintenance rations. Because of this, the prices of these three cereals tend to fluctuate together.

Barley May Grow in Importance

In the greater portion of the oats producing territory of this country, barley produces more feed to the acre than do oats. It is probable, therefore, that as the shortage of corn begins to be felt, the acreage of barley in this country will increase and that it will ultimately become one of our major crops.

Why Barley Is Such an Important Crop

In Farmers' Bulletin, 968, H. V. Harlin says:

"Barley should be more widely grown in the Northern and Western States. It is a protection to our grain supply, as it produces a good, non-glutinous flour and can be milled by wheat mills with little change of machinery.

"It is an excellent grain feed for stock, being almost the equal of corn. It, however, competes with corn in few places, as it is mostly grown outside the limits of profitable corn culture. It produces more pounds to the acre than oats or wheat. If necessary, it can be seeded later than spring wheat, and hence, interferes little with the wheat acreage in the spring wheat region. It supplies the needed grain feed necessary for the increase of live stock, which sometimes must come with diversified farming in the areas where grain farming is now the only enterprise.

"The best lands for barley are well-drained soils that are not sandy. The best returns are obtained from early seeding. The best methods of preparation are fall plowing in the humid-spring region; disked corn ground on the great plains; and summer fallow in sections where the crop is winter seeded. The grain should not be thrashed too close, as broken kernels lower the market value.

"The best-yielding varieties are Tennessee Winter in the humid-winter region, Manchuria and Oderbrucker in the humid-spring region, and Coast Hannchen, Mariout, White Smyrna, Chevalier, and Trebia in the arid region."

Germany, the Greatest Importer of Barley

Russia has, in the past, been the largest exporter, and Germany the largest importer of barley. The World War eliminated Russia. There is no other

important exporting nation, although India, Roumania, and Austria-Hungary in the years 1909-13 exported an annual average of 17 million bushels each. Aside from Germany, the most important importing nations are: England, Belgium, the Netherlands, and France.

It is of interest to note that Japan is a very large producer of barley, standing fourth in the list of nations, not counting Russia. But the barley produced in Japan does not enter world commerce, nor does this nation import or export any considerable quantity.

Part VI.

WHY RYE IS VALUABLE IN SOME SECTIONS

Rye has three characteristics which render the crop of great value in certain sections of the world. In the first place, it is the hardiest of the winter cereals and can thus be grown farther north than any other of them. In the second place, it is indifferent to a wide range of rainfall, thriving under conditions either too wet or too dry for wheat. In the third place, rye is pre-eminently adapted to light, sandy soils, and to poor soils generally.

The grain of rye is not so desirable as wheat for bread making purposes, and rye does not compete with wheat ordinarily except under conditions where one or more of the above-mentioned characteristics of rye give it a marked advantage over wheat. In feeding value, it is similar to barley and is relished by all farm animals.

Rye is valuable as a pasture plant for early spring. Another very important use to which it is put in this country is as a green manure crop, particularly on light soils in fruit and vegetable growing regions in the East. It hardly has a rival in the northeastern quarter of the United States as a winter crop for this purpose.

Where Rye Is Grown in the United States

The principal centers of rye production in the United States are eastern New York adjacent to the western boundary of Massachusetts, where there is an extensive area in which rye is very commonly grown. Considerable rye is also grown in the wheat growing country of western New York. Central and northwestern New Jersey and eastern and southern Pennsylvania constitute an important rye growing region, particularly the region about Trenton, N. J. From here, the crop extends down the valleys of the Appalachian Mountain system into northern Georgia.

Michigan Leads in Rye Acreage

Rye is an important winter crop throughout nearly the whole of the Southern Peninsula of Michigan. It is somewhat less important in northern Indiana, in western Ohio, north central Kentucky, and central Tennessee.

Michigan stands first in rye acreage, with 660,000 acres harvested in 1920. Wisconsin and Minnesota are practically tied for second place with about 480,000 acres each. Indiana is third, with 310,000 acres.

In Wisconsin, rye growing is concentrated more or less in three localities, one being along the eastern margin adjacent to Lake Michigan; another being in the south central portion of the state; the third, that section of the state adjacent to Minneapolis and St. Paul. Around these two latter cities there is a very extensive development of rye culture in both Minnesota and Wisconsin.

From there the crop extends westward and northwestward into the Red River Valley and westward to the center of North Dakota. Another branch extends through southeastern South Dakota, central and western Nebraska, into eastern Colorado and western Kansas.

Smaller areas of rye are found in most of the Mountain states.

In the main, the crop is distinctly a northern crop. Its absence from New England is to be attributed to economic conditions. In Pennsylvania, New Jersey, Michigan, Wisconsin, and Minnesota, where the largest development of the crop occurs, its presence is largely attributable to the fact that there are considerable areas of sandy soils in those states, more suitable to rye than to wheat.

Like corn, oats, and barley, rye is a low-priced cereal, for which reason it does not constitute a very important commodity in world commerce.

Rye More Important in Europe

Rye is a much more important crop in Europe than it is elsewhere in the world, particularly in Russia, Poland, Germany, and Austria-Hungary. Russia before the World War produced more than 20 times as much rye as does the United States, the average for the years 1909-13 being 791 million bushels. For the same period, the average crop of rye in Germany was 445 million bushels; in Austria-Hungary, 164 million; and in Poland, 90 million. In general, the greatest development of the rye crop in Europe lies to the north of the great wheat growing region, which, in turn, lies slightly to the northward of the corn growing region, although overlapping it considerably. For the most part, the rye and oat growing regions of Europe are nearly identical.

Table VII. Rank of Nations in Rye (Based on 1909-13 figures)

Production	Exports	Imports
1. Russia	1. Germany	1. Netherlands
2. Germany	2. Russia	2. Germany
3. Austria-Hungary	3. Netherlands	3. Finland
4. Poland	4. Roumania	4. Norway
5. France	5. Bulgaria	5. Denmark
6. United States	6. Belgium	6. Belgium
7. Spain	7. United States	7. Russia

Two Nations Grow Most of the Export Rye

Only two nations export any material quantity of rye, Germany and Russia. Roumania, Canada, and the United States are the only other nations that export as much as a million bushels. The imports of rye are confined to those nations in Europe that do not produce enough for their own needs.

The World War practically stopped the export of rye. Germany will doubtless return to her former commanding position in respect to this crop. The Russian situation is not so hopeful.

Part VII.

NOT MUCH BUCKWHEAT MARKETED

The most distinctive character of the buckwheat crop is its ability to thrive on poor land. The great bulk of the crop produced in this country is found on the poor uplands in the hill country of New York and Pennsylvania. The acreage of the crop in the United States has changed very little in the last 40 years. Except in the two states mentioned, it is quite unimportant as a market commodity.

Part VIII.

FLAX AS A MARKET CROP

Flax produces two valuable products. By far the larger part of the world's acreage is grown for the seed. But in some parts of the world, particularly in Asia and Europe, it is grown for the fibre which occurs in the bark of the stem. In the United States, it is grown for seed because the production of flax fibre is practicable only where hand labor is abundant and cheap.

Table VIII. Rank of Nations in Flax (Based on 1909-13 figures)

Production		Exports
For Seed	For Fibre	
1. Argentina	1. Russia	1. Argentina
2. India	2. Austria-Hungary	2. India
3. Russia	3. Belgium	3. Canada
4. United States	4. Poland	4. Russia
5. Canada	5. France	
	6. Japan	

The fibre is used in making linen cloth, the word linen being derived from the Latin word for flax, "Linum." The seed is valuable chiefly for its high content (30% or more) of linseed oil, which is one of the best of the drying oils. Its principal use is in the manufacture of paints, varnishes, linoleum, etc. The cake left when the oil is extracted, is an exceedingly rich nitrogenous feeding stuff greatly relished particularly by cattle, and it is widely used as a means of balancing the dairy ration. Small quantities of it are also fed to sheep, hogs, and horses.

The flaxseed crop illustrates well the economic position of a commodity which has only one use and for which there is no satisfactory complete substitute. Attention has already been called to the fact that the prices of corn, oats, and barley are always closely related because any one of these grains may be substituted for the other within wide limits, the cheaper one having the preference. This prevents the price of any one of these grains from rising or falling much above or below the comparative level of the others.

Why the Price of Flaxseed Fluctuates Violently

This is not the case with flaxseed. When more flaxseed is produced than is sufficient to meet the demand for linseed oil, the price falls very rapidly,

and even the resulting low price does not greatly stimulate the use of the commodity.

On the other hand, if the supply is not sufficient to meet the demand, substitutes are largely lacking, and the price rises to very high levels. Moreover, these high prices do not materially reduce the demand for the seed.

There are certain oils that, within narrow limits, can be substituted for linseed oil in most of its uses. They are the semi-drying oils, the principal of which are soy bean oil and sunflower seed oil. Twenty to 30% of soy bean oil may be substituted for linseed oil in the manufacture of paints, varnishes, etc., without materially reducing the quality of the product. Somewhat smaller quantities of sunflower seed oil may also be used in a similar manner. But the amount of substitution thus possible is not sufficient to affect materially the influence of supply and demand on the price of flaxseed.

There is thus very great uncertainty in the flax crop. In 1905 the average farm price of flaxseed on farms in the United States on December 1, was 84.4 cents, the corresponding price in 1910 was $2.317. In 1919 it rose to $4.38, while a year later it had fallen back to $1.76.

Table IX. UNITED STATES PRODUCTION AND PRICE

Year	Bushels	Price
1902	29,285	$1.05
1905	28,478	.84
1910	12,718	2.31
1912	28,073	1.14
1915	14,030	1.74
1919	7,661	4.38
1920	10,990	1.76

Four States Produce Most of Our Flaxseed

Because of this wide fluctuation in price, there is very marked fluctuation in acreage of flax. The

crop in the United States is practically confined to western Minnesota, the two Dakotas, and eastern Montana. This area has an important extension into the adjacent province of Canada. A much less important producing area is found in eastern Kansas and western Missouri.

Why Acreage Rises and Falls

Flax is highly subject to certain fungous diseases, particularly when grown frequently on the same land. It thrives best on land newly put into cultivation, and in flax growing sections it is known pre-eminently as a new land crop.

Much less new land is available now than formerly, and the acreage of flax in general is smaller than it was a decade or so ago. On account of uncertainty of rainfall in the flax growing region, the yield per acre also fluctuates markedly.

About a decade ago, the acreage of flax had fallen so low that the price had become very high. The principal users of linseed oil put on a vigorous campaign for the extension of flax acreage, resulting in 1912 in a crop of 28 million bushels, as compared with a 13 million bushel crop in 1910. As a result, the price per bushel of the seed fell from $2.32 in 1910 to $1.15 in 1912. In 1920 the crop amounted to only 11 million bushels and the year before that it was less than 8 million bushels.

Stabilization of production is a serious necessity in the case of this crop. The experience of flax growers has made them afraid of the crop, for which reason, it takes two or three years for high prices to tempt them to any material extension of acreage.

The United States Imports Flaxseed

At the present time, the United States is not producing enough flaxseed to meet our needs and

imports on a considerable scale are coming from Argentina and Canada. Russia and India are also important exporters of flaxseed.

Where Flax Is Grown for Fibre

In the production of flax fibre, Japan is an easy leader, or was in 1918. There was a very heavy increase in the production of flax fibre in Japan between 1913-18. For the five-year average, 1909-13, Russia produced much the largest amount of flax for fibre, in fact, her production was 61% of the world's crop. Russia was second in 1918, followed closely by Austria-Hungary. Then come Belgium, Poland, and France in the order named.

Part IX.

FOUR SECTIONS GROW RICE

Rice is the world's largest cereal crop and is the great cereal crop of southeastern Asia and adjacent islands. Statistics are available for all the principal producing countries except China, Cochin China, and parts of India. The absence of statistics from China, which is undoubtedly one of the large producers of rice, must be kept in mind in reading the following comment on the rice crop.

There are only three other localities in the world where rice production is of any importance, although in each of them the crop is insignificant compared to the position it occupies in southeastern Asia. These three localities are: the Nile Delta, the Valley of the River Po in northern Italy, and the United States. Small areas are cultivated in southwestern and southern Louisiana, southeastern Texas, east central Arkansas, California, and in a narrow fringe along the south Atlantic Coast.

Table X. Rank of Nations in Rice (Based on 1909-13 figures)

Production	Exports	Imports
1. India	1. India	1. Dutch East Indies
2. Japan	2. French Indo-China	2. Singapore
3. Java and Madura	3. Siam	3. Germany
4. Siam	4. Singapore	4. Ceylon
5. Korea (Chosen)	5. Netherlands	5. Netherlands

Of the great producing countries in southeastern Asia, only three produce a surplus. These are: India (the world's largest producing nation), Siam, and Indo-China; all of them situated on the Bay of Bengal, or on the peninsula lying to the east of this Bay. China, Japan, the Philippines, Ceylon, and the Dutch East Indies (Java and Sumatra), all important rice producing regions, are extensive importers.

In this part of the world, rice takes the place of the bread grains and bread is practically unknown among the native inhabitants.

India Is the Greatest Producer of Rice

Remembering that statistics of production are not available for China, nor for Indo-China, one of the principal exporting nations, of the total world production of cleaned rice amounting to nearly 111 billion pounds, India in 1909-13 produced over 75 billions, or more than 67% of the whole. But of this total production, India exported only about 6%, rice constituting the principal food of her natives.

Japan stands second in production, with 14 billion pounds, but imports 656 million pounds.

China, which probably produces more rice than Japan, imports about 700 million pounds of this cereal.

The United States Is Tenth in Rice Production

Rice culture was introduced into South Carolina in 1694. By 1718, the south Atlantic Coast was producing nearly five million pounds of cleaned rice a year, about two-thirds of which was exported. The production of rice increased rapidly on the flood plains above salt water along streams flowing into the Atlantic Ocean until at the beginning of the Civil War the total production amounted to over 100 million pounds annually, about half of which was exported. The Civil War almost destroyed the industry, and it was 15 years after the close of that war before rice culture on the south Atlantic Coast regained the commanding position it had previously occupied.

Development of the American Rice Industry

About 1885, the cultivation of rice began to spread rapidly on the level prairies of southwestern Louisiana and southeastern Texas. Later it developed on a large tract of prairie land in east central Arkansas. In these localities, the nature of the land was such that the use of modern farm machinery was practicable in handling the crop. On the Atlantic Coast, the rice soils are so soft that most of the work must be done by hand. When horse power is used, the animals must wear large marsh boots. Heavy machinery can not be taken onto the land.

In recent years California has become an important rice growing state.

Since the beginning of the Civil War, until very recently, we have been importing large quantities of rice. But shortly after the beginning of the twentieth century, the development of rice culture had become so extensive in the Southwest, where production was considerably cheaper than on the Atlantic Coast, that overproduction was threatened and prices fell to the point where the

Atlantic Coast region was practically eliminated from rice production. During the period of high prices incident to the World War, there was a renewal of rice growing in the Carolinas, but falling prices since the war have again practically eliminated this region as a producer of rice.

How the United States Changed From an Importing to an Exporting Nation

The high prices that occurred during the World War stimulated rice production in the United States enormously. Up to and including 1918, we were importing very large quantities. By 1919 production had risen to the point where the exports greatly exceeded the imports, since which time we have been a rice exporting nation. Since in exporting rice, we are in competition with the cheap labor of the Orient, the rice industry is far less profitable than when we were still an importing nation.

What Is the Future of Rice Growing in America?

Central California has proved to be excellent rice territory and shortly preceding and during the World War, there was a very extensive development of rice production in that state.

The future of the rice industry is more or less uncertain. We have much more good rice land than can be profitably devoted to the crop. The demand is not enough to use as much rice as could be grown.

Orientals Eat the Most Rice

The Year Book of the Department of Agriculture for 1920, page 608, gives the following statistics relating to the per capita consumption of rice in the leading rice-using nations for which statistics are available. In the Orient, the per capita consumption of rice rises to about 280 pounds per capita. In the principal nations of Europe it stands at from about 10 to 17 pounds per capita. In the Netherlands for the years 1909-13 the figures show 50 pounds, but

this is probably the result of a deficiency in statistics. It is probable that a considerable proportion of the rice which the figures indicate was consumed in the Netherlands was re-exported to other nations in Europe. For the years 1914-18 the annual consumption in the Netherlands was only 17 pounds. The figure for the United States is less than 10 pounds per capita.

America Not a Big Rice Consumer

The American people, except in the rice growing sections of the South, have never been great consumers of this cereal. One reason is probably the very general practice of American rice mills of removing from the surface of the rice grain the entire aleurone layer, which reduces the flavor of the grain and removes most of the protein it contains. From this country, the practice of polishing rice spread to the Orient.

High Milling Charges Discourage Rice Planting

When the rice grain is harvested, it is covered by a rough, flinty shell or hull which must be removed by a special milling process before the grain is marketable.

The ownership of the rice mills of this country is concentrated in a few hands, and so the owners of the mills are in a position to take large toll and they have, at times, by their exactions, greatly discouraged the growing of rice. Cooperative milling may some day remove this obstacle.

Part X.

DEVELOPMENT OF METHODS OF MARKETING GRAIN

Settlement of the Ohio and Mississipi River Valleys preceded by many years the development of transportation facilities. The lack of such facilities made it impossible for farmers to market most of their products.

They were limited practically to the production of what could be utilized on the home farm. Lack of transportation facilities led to the projection of very extensive systems of canals for the purpose of connecting interior points with the Great Lakes and with the Ohio and Mississippi rivers.

How Transportation Built Up Marketing

By 1832 the construction of these canals had become the dominant development of the region. But a few years later, railroads began to extend westward from the Atlantic Coast region into the Ohio Valley. The extension of railroad lines into this region during the middle decades of the nineteenth century is one of the most remarkable industrial developments in the entire history of the human race.

The presence of these railroads made it possible for the farmers in the interior to reach the markets of the world with their products. The export of beef, pork, wheat, and corn occurred faster than the world's needs for these commodities increased, and so an era of low prices prevailed, with consequent hardship for people on western farms.

It was not until about 1895 that the world demand for the products of the Mississippi Valley began to exceed the supply, and the hard times of the previous half century began to give way to the better times that have prevailed since.

This story is recited to show that transportation facilities are the leading factor in the marketing of farm products. The railroads have now expanded into all portions of the country and have almost ceased further expansion.

The Government subsidized many of the transcontinental lines by gifts of enormous tracts of lands. The income from the sales of these lands enabled the railroads to transport farm products very cheaply. But, beginning about the end of the first decade of

the present century, this source of income had practically been exhausted and it was necessary for transportation lines to obtain their income more largely directly from the goods transported.

Since that time, there has been a gradual rise in the cost of transportation, followed by enormous increases during and following the World War. These increases in cost of transportation have thrown agricultural production more or less out of balance. Unless there is marked reduction in transportation costs within the next decade, there is bound to be more or less redistribution of the various agricultural enterprises.

From what is said, it is clear that a course in marketing of farm products must cover quite fully the entire problem of transportation, and other lessons in this course will do this.

Handling and Storage Facilities Important

Next to transportation facilities, come facilities for handling the products, such as elevators, storage space, warehousing, and the like. These usually develop as the production of a product develops in a region. Full consideration of such facilities are a necessary part of a course in marketing, and some of the lessons in the course will be devoted entirely to this subject.

Present Local Grain Handling Facilities

Grain buying at local points is commonly divided between three types of elevator operators: 1. the individual owner; 2. the line elevator; 3. the farmers' cooperative elevator.

The individual elevator is owned by one man or a company of men, and usually the ownership includes only one elevator. Line elevators are owned by a syndicate or large company that operates many elevators, usually located along one line of railroad.

Farmers' cooperative elevators are owned by corporations made up of farmers. One corporation usually owns only one elevator, and this elevator is maintained primarily for marketing the grain of the owners.

In the development of the local elevator industry, individual owners and line companies came first. As a protest, largely against the line elevator, the farmer-owned companies came into the field.

Line elevators are operated chiefly in new territory in the Central West. But it is common to see individual owned elevators, line elevators, and a farmers' cooperative in the same town, all three competing for the grain of the community.

The operation of a local elevator will be discussed in detail in later lessons.

Market Reports a Big Aid

The third important element in marketing is the development of organizations that will enable both buyer and seller to know what the proper price of any given commodity is at any time and place. The actual marketing of grain is involved here. One of the most important factors is the standardization of products, for without such standardization it is impossible for either buyer or seller to know the real market price of a commodity until it has reached its ultimate destination.

When Grading Began

It will be surprising to many farmers and dealers in grain to learn that the very first attempt at the grading of grains in the world took place at Chicago in 1857. This first attempt consisted merely in distinguishing two grades of red winter wheat, the one known as Red Winter and the other as No. 2 Red Winter. Up to that time, wheat had been merely "wheat," and corn merely "corn," without reference to its quality.

It is easily seen that refinement in grading renders marketing possible on much lower margins than would otherwise be possible because the dealer knows more accurately the price he can afford to pay for a given sample of a commodity. Some of the most important lessons of this course will deal with the entire subject of standardization of farm commodities.

What Cooperation Has Done

In recent years, the cooperative marketing of farm products has risen to prominence. The principal service to be rendered producers by cooperative marketing is in the dissemination of more intimate knowledge of the grades of farm products and of the relative value in the markets of the world of these grades.

Cooperative marketing, when sufficiently developed, can also prevent to a large extent the manipulation of markets in farm products, for a large and properly financed cooperative organization can market a commodity in an orderly manner; that is, as the commodity is needed for consumption. By thus keeping the ownership of the commodity in the hands of the producer until it is needed for consumption, the markets should tend to be steadier and each producer should come more nearly getting the true market value of his commodity.

Part XI.

PER CAPITA CONSUMPTION OF EDIBLE CEREALS

In the per capita consumption of wheat, France leads, with Belgium a close second. Then follow Italy, the United Kingdom (England, Scotland, Ireland, and Wales), and the United States. In the other countries of Europe and particularly in the Orient, the consumption is much lower because of the more extensive use of other cereals.

Germany leads in the consumption of barley, followed by Austria-Hungary, Belgium, the United Kingdom, and the Netherlands in the order named. In these countries, barley is used largely in the manufacture of beer.

The United States Uses More Corn and Oats Than Any Other Nation

In per capita consumption of corn, the United States far outstrips any other country. The reason for this is that, in this country, by far the greater part of the corn crop is used for stock feeding. In the other consuming countries a much larger proportion is used directly as human food.

The United States also leads in per capita consumption of oats. This grain is also used in large part as a feed for stock, particularly horses. Germany is a close second and France, a close third. Belgium and the United Kingdom follow next in order.

Germany leads in the consumption of rye, followed by the Netherlands, Belgium, and Austria-Hungary, in the order named.

In the order in which the cereals are consumed, wheat stands first in France, with oats a close second. In Belgium, wheat is first; oats, second; and rye, third. In Italy, wheat is first, with corn second. In the United Kingdom the order is: wheat, oats, barley. In the United States, corn leads, followed by oats and wheat, in the order named. Rye is the leading cereal in the Netherlands, followed closely by wheat. Oats leads in Austria-Hungary, followed closely by corn and wheat. In Germany, oats lead, with rye second, barley third and wheat fourth.

Statistics are not available for the purpose of determining real secular trend in the per capita consumption of the various edible cereals. About all that may be said on this subject with confidence, is that there is a tendency for wheat to displace the other bread-making cereals when the price of wheat is

not so high as to make substitutes decidedly cheaper.

The enormous population in the Orient appears to be well satisfied with its rice, and there is no immediate prospect that any large amount of this cereal will be displaced by wheat.

NOW, WHAT ABOUT STANDARDIZATION?

You will remember that in Lesson A you learned that standardization is usually the first marketing service performed upon crops. Consequently, the next lesson in this course will treat of this first marketing service. As a matter of fact, a very large part of the wonderful improvements in marketing farm products that have been wrought during the past few years, have been brought about by standardization.

There is still much to be done, but marketing grain is a much more certain and profitable occupation now than it was when grain was offered to buyers in a hit or miss fashion.

Does standardization pay?

Does the increased price pay for the work of grading?

Should we have more grades of grain, or less?

Who should determine standard grades?

Can we have one set of grades that will apply to all sections of the country?

Does grading have anything to do with our foreign trade

Is standardization something that should be confined to manufactured goods?

These, and dozens of other questions will be answered in the next lesson. And after mastering it, you will be prepared to take your first step as a real leader for better marketing in your community.

GLOSSARY OF MARKETING TERMS USED IN THIS LESSON

Inasmuch as a glossary is provided with each lesson, no attempt is made either to give complete definitions in each glossary, or to give all the possible meanings of each term when used in different connections.

The definitions here given explain the meanings of the term as applied to marketing farm products, and more specifically the meaning as used in this lesson.

It is difficult to find in dictionaries satisfactory definitions of many marketing terms as used in a commercial sense. In fact, it would be difficult to find a definition for some of these marketing phrases in any other place except in this glossary.

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cooperative elevator, An elevator owned by the producers of grain, whose ownership is primarily for the purpose of gaining an advantage in marketing their own grain.

financial depression, A period in which loans are difficult to secure except upon the basis of liberal collateral and for short periods. Rates of interest on loans generally increase and buying in general is reduced.

fluctuation, n. More or less violent changes; usually used to refer to changes in prices of any commodity.

green manure plant, A plant grown for the purpose of plowing under while green to fertilize and improve the physical condition of the soil.

intensive agriculture, The growing of crops that require much labor, and that produce very large returns from a given acreage. The raising of grain only is usually considered to be "extensive" agriculture. The growing of grain and the feeding of live stock when carried out on the same farm, constitute more intensive agriculture. Fruit growing and truck farming are intensive.

line elevator, An elevator owned by a corporation that also owns many other elevators, usually all located along one principal line of railroad.

manipulation of markets, This term is used to refer to the actual or apparent influence over prices that may be exerted by a man or group of men. It is usually used to refer to an unfair or artificial influence exerted primarily for the benefit of the persons exerting the influence.

nitrogenous, adj. Containing nitrogen. As used in connection with crops, this usually describes a plant that contains a comparatively high percentage of nitrogen.

over production, n. When more is produced than appears to be wanted by the buyers of the country, the condition is referred to as over-production. This condition may be due to a bumper crop, to a decreased demand, or to increased acreage. Over-production usually results in lowered prices and is often followed by decreased production, resulting at times in under-production and rising prices.

pasture plant, A plant used as pasture for live stock, such as blue grass, clover, alfalfa, etc.

secular trend, A general movement in one direction, determined by drawing a straight line through a broken line that wavers up and down, showing the general rise or fall, over a long period, of the quantity represented by the broken line. Thus, the secular trend of price after the civil war was downward till about 1895, upward after that time.

stabilization of production, This phrase is used to refer to that condition when production is comparatively uniform for a period of years. It is usually assumed that the quantity of production is very near to the actual demand for the product.

supply crop, (the opposite of cash crop) A crop grown primarily to supply feed for the live stock raised on the same farm, or food for the farm family.

under production, n. When less is produced than appears to be wanted by the buyers of the country, the condition is referred to as under-production. This condition may be due to a partial crop failure, to an increased demand, or to insufficient acreage. Under-production usually results in rising prices and is often followed by increased production, and sometimes by over-production and falling prices.

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