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THESIS

The World's Apple Market

Harvey Snyder Adams

1922

CORNELL UNIVERSITY
THE GRADUATE SCHOOL

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for the degree of Master of Science

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THE WORLD'S APPLE MARKET

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T H E S I S

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Presented to the Faculty of the Graduate School
of Cornell University in Partial
Fulfillment of the Requirements
for the Degree of

MASTER OF SCIENCE

by

Harvey Snyder Adams

June, 1922

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THE WORLD'S APPLE MARKET

With special reference to the commercial apple crop produced in important regions throughout the world, the varieties of apples grown by and quantity exported from the United States, and the important markets for American grown apples, domestic and foreign.

Acknowledgments

In preparing this thesis the writer has received valuable information and suggestions from members of the Department of Agricultural Economics and Farm Management and the Department of Horticulture of this University, which help has been much appreciated.

To Dr. James E. Boyle whose constructive criticisms have aided in making this study center upon the more vital phases of the economics of fruit marketing special recognition and acknowledgment is given.

CONTENTS

I

In making this study the writer has endeavored to ascertain in which countries and regions the apple is being grown, both commercially and for home use, and, as far as possible, trace the development of the apple industry in those regions from the early plantings to the present date.

Very definite limitations were encountered in attempting to correlate the data on yields with prices, or the influence of prices upon apple plantings throughout the United States. That some relation exists there is little doubt, however, in most cases the data does not furnish conclusive evidence to justify positive statements concerning the relation of one factor to another. On the other hand, in comparing the receipts of apples on the New York City and Boston markets with prices for a period of years it was found that a reasonably accurate correlation prevailed.

Commercial apple plantings increased very rapidly in regions having special climatic conditions favorable to fruit growing, in fact almost simultaneously, with the improvement in transportation facilities between these regions and the large centers of population.

Control of moisture conditions through irrigation

made possible by the building of large reclamation projects in the west and northwest largely accounted for the large plantings of apples for commercial purposes in these regions during a period which had been preceded by fifteen years of relatively low prices for apples.

With the exception of the more recent commercial plantings very little attention has been given to specialization in the production of a few varieties primarily adapted to our large domestic and foreign markets. Regions with such specialization are marketing their fruit at a great advantage when compared with those having many varieties most of which are poorly adapted to the market and shipping requirements.

Much progress has been made by the fruit growers during the past decade in marketing their apples. Through united efforts in organized cooperative associations more efficient grading, packing, warehousing, advertising, and marketing have been made possible as well as more intelligent and economical production. The marketing channels which have been numerous,and frequently costly,are being reduced in number with those remaining, gradually becoming more efficient factors in our distribution process.

Summary and Conclusions

Commercial apple growing has become a highly developed and highly specialized industry. During the last tow decades it has made the greatest strides in regions where it has been recognized as such.

Co-operative grading, packing, warehousing, and marketing have enabled the apple grower to sell his product on the world's best fruit markets in competition with citrus and other fruits.

The commercial apple crop in the United States represents 40 to 60 per cent of the total crop, the average for the past six years being 47 per cent. In 1921 it was 62 per cent of the entire crop reflecting the importance of the commercial orchards in the Pacific Northwest.

Commercial apple growing in the Northwest reached a high degree of development on newly irrigated land because of the high acre value of the product or the lack of competition of equally valuable crops.

In the apple growing regions of the Northwest there is a definite correlation between commercial orchard plantings and the building of irrigation projects.

The most important commercial plantings in the United States were made during the following years:

1860-1875	New York.
1885-1895	Pennsylvania and Virginia.
1890-1900	Ozarks and Prairie States.
1900-1910	Western and Northwestern States.

Very few important plantings have been made since 1910.

Until new plantings are made it is hardly expected that the commercial crop will exceed the record crop of 1920, totaling 36,272,000 barrels.

For the 5-year period, 1916 to 1920, 69 per cent of the commercial crop was marketed in barrels, and 31 per cent in boxes.

The most important commercial apple growing regions today in order of importance are as follows:

1. The Pacific Northwest
2. Western New York
3. Shenandoah--Cumberland
   (Penna., Maryland, Virginia)
4. California

The Dominion of Canada is the second important commercial apple producing country in the world. Australia, Tasmania and New Zealand are third in importance with a crop half as large as that produced in Canada.

An important factor in the Australian industry is the fact that their harvesting and marketing seasons correspond with our winter and spring, thus providing an active market for their surplus fruit in the United States and Europe.

While apples are an important product in America and Europe they are a relatively unimportant fruit in Asia and Africa.

During the 5-year period, 1914-1918, the apple ranked eighth in importance when compared with the value of other farm crops produced in the United States. The apple is our leading fruit crop.

More than one-fourth of our total production consists

of two varieties, Baldwin and Ben Davis. The first twelve varieties provide over 60 per cent of our total apple crop.

In establishing a commercial orchard a few varieties well adapted to the region and market requirements should be planted in preference to many varieties as too frequently has been the case in the past.

During the 1919-1920 shipping season, 77 per cent of the fruit shipped from the Pacific Northwest consisted of six varieties, and of these six, two varieties furnished half the shipments.

Exports, when measured by the average for 5-year periods from 1852 to 1921, have increased from 37,000 to 1,800,000 barrels annually. The largest exports of ripe apples from the United States occurred during the 1913-1916 period. For the last five years, 1917-1921, the annual exports were only 77 per cent of those for the previous period. There was only one year, 1915, when the total exports exceeded 2,000,000 barrels.

The value of ripe and green apples exported during the three years, 1919, 1920, 1921, exceeded that for the fourteen years, 1896 to 1909, and for the entire 7-year period, 1912 to 1918. The total value of exports for the past three years has slightly exceeded $43,500,000, an average of more than $14,000,000 per year.

When including the exports of dried apples the total value of apple exports reached the high mark of $18,581,110 in the year 1919. Two years later, in 1921, the total value of exports of ripe and dried apples was $16,188,708.

For the years 1919, 1920 and 1921, the exports of ap-

ples represented 6.5, 4.9, and 9.6 per cent, respectively, of the commercial apple crop for those years. The simple average for the three years is 7 per cent. The average annual exports for the six year period, 1916 to 1921, were 5.6 per cent of the commercial crop.

The United States is the greatest fruit producing as well as the greatest fruit consuming country in the world. Apples represent fifteen per cent of the total value of fruit exports.

Statistics for a period of years show that more than two-thirds of our apple exports (in value) are to the United Kingdom (England, Ireland, Scotland and Wales). The Scandinavian countries are becoming more important markets as illustrated by the increase in exports since 1910. With an improvement in economic conditions Germany should again become an important market for American apples.

The average annual shipments of apples in the United States for the years 1916 to 1920 were approximately 75,000 cars. It is a big undertaking to move this volume of a product to market without waste or loss.

In the Pacific Northwest alone where in 1919 sixty per cent of the fruit was shipped during October and November, it required an average of 415 cars at the sidings per day for each shipping day in those two months to move the crop to market.

From 1915 to 1920 prices of apples practically trebled while the purchasing power remained almost constant at 74 to 76 until 1919 when it rose to 90 followed by a fall to 85 in 1920. The secular trend of purchasing power of apples

from 1910 to 1920 was downward falling considerably below that for 31 farm products.

During the first four years of the period, 1910 to 1920, a box of oranges had a slight advantage over a bushel of apples in purchasing power. For the remainder of the period, however, organes fell much below apples in purchasing power when compared on the same base, 1909-1914.

Better warehousing facilities near the large producing sections would prove an important factor in stabilizing prices during the heavy crop moving months.

In marketing apples there are three to six channels through which the fruit passes before it reaches the ultimate consumer. Each of these renders a service and makes a charge for same. Time and place services are legitimate marketing costs and deserve a fair compensation.

Gross profits of retailers vary from 75 to 350 per cent. Lowering this margin taken by retailers by a reduction in price would increase the consumption of apples and, through the increased volume of business, return equally good profits.

Attempts to increase the use of apples in the diet should be directed toward the weak link in the marketing process, namely, the one connecting the retailer and the consumer.

II

History of Commercial Apple Growing

The apple industry in the United States has responded to rather definite cycles. Periods of heavy planting and high prices have alternated with periods of less extensive plantings and low prices. Commercial apple growing dates back to about 1850. It was about this time that two brothers, A. J. Downing and Charles Downing, were devoting much of their time to the development of the apple industry in the Hudson Valley. The former in 1845 published one of the first treatises on apples entitled "Fruits and Fruit Trees of America" which served as a reliable guide on apple growing for many years.

Another early leader in the apple industry was Patrick Barry, part owner of the Mt. Hope Nurseries at Rochester, New York, founded in 1840. Mr. Barry was a pioneer in the commercial development in Western New York, a region which long has held first place in the commercial apple industry in the United States.

Another region which has held an interesting as well as an important place in the history of apple growing is the Piedmont or Albemarle Pippin Region at the base of the Blue Ridge Mountains in Virginia. It was the Albemarle Pippins which Arthur Stevenson

American Minister to England, sent to the late Queen Victoria, that so pleased her that she caused the import tax on apples to be removed. This marked the beginning of our export trade to England, which was in the future to play so important a part in furnishing a market for our surplus apples.

It was during the eighties that the commercial plantings in the Missouri River and Ozark Regions were made, continuing through the nineties. This region for many years had the largest number of trees in the United States. The late spring frosts occuring during the period 1900-1910 caused a very heavy loss of trees in this region materially affecting its importance as a commercial apple section. Included in this section are the Loess Apple Belt along the Missouri River in northwestern Missouri, southwestern Iowa, southeastern Nebraska, and northeastern Kansas, and the Ozark region in southern Missouri and northwestern Arkansas. The Ben Davis apple grows to perfection in the Ozark Mountains and until within recent years was produced almost exclusively. In recent years the Winesap and Jonathan varieties have become important in the new plantings.

The first section in the far west to take up apple growing on a commercial scale was the Pajaro Valley in California. Several commercial orchards were set out in 1858 by Isaac Williams and Judge R. F. Peckman. Mr. Williams offered his first fruit on the San Francisco market in 1867. From this date the demand

for apples of good quality increased and numerous plantings were made. The period from 1880 to 1900 witnessed a rapid development of the apple industry in California at a time when the famous Wenatchee and Yakima Valleys in Washington were in their infancy. The Pajaro Valley differs from most other regions in the northwest in its climatic conditions. The rainfall here is sufficient to grow large yields without resorting to irrigation. Even today California is the second state in importance among the western states. The Yellow Newtown and Yellow Bellflower are the leading varieties, the former entering largely into the export trade, and the latter offered on the home markets.

Standardization in package, methods of handling, and cooperation in marketing their product, have not made as rapid progress in California as in the northwest. A large percentage of the growers sell the fruit on the trees for a lump sum to Slavonian packers, who care for the orchard, do the spraying, thinning, and finally the harvesting of the crops. By thus assuming the growers risk these small packers quite naturally require a safe margin in making their contracts. This system cannot give the same return to the owner as would accrue if he performed these operations and combined with other growers in packing and marketing the fruit co-operatively.

Commercial apple growing in the State of Wash-

ington, now the leading state in this industry, dates back to 1877 when the first orchard was planted in the Yakima Valley by an Indian named Klickitat Peter. This region has a very small rainfall and must resort to irrigation. In 1888 and 1889 the first irrigation companies were organized followed by a rapid development of the apple industry. Six years later, in 1894, the total shipments from the Yakima Valley did not exceed twenty-five carloads. With the development of the irrigation projects came very extensive plantings of apple trees, especially during the years 1900 to 1908.

The Wenatchee Valley, lying north of Yakima and separated from it by mountain ranges, started its development in 1896 when the Gunn ditch was built to provide water for 600 acres of land. The development in this valley was pehnomenal up to 1913 when it possessed a total of 20,000 acres of irrigated land most of which was planted to fruit. This valley is today the leading and most intensive apple growing region in the world. The total acreage in North Central Washington, including the Wenatchee Valley and the upper Columbia River Region, is approximately 40,000 acres. For the shipping season of 1919-1920 the shipments reached 12,300 cars of apples. Land values are very high, averaging nearly $2,000 per acre. The co-operative marketing of fruit is highly developed. The organizations are the logical outgrowth of a great need requiring the marketing of their fruit in distant markets. It is here that the grading, packing, and standardization has been de-

veloped to the highest degree known in the history of commercial apple marketing.

Another prominent apple growing region in the northwest is the Hood River Valley in Northern Oregon. This Valley has a rainfall equal to that in New York and differing widely from the Wenatchee and Yakima Valleys. In spite of this fact irrigation has been found advisable and is common in most of the orchards. Due to the fact that light bearing varieties, such as the Yellow Newtown and Spitzenburg predominate, the yields do not compare with those in the important valleys in the state of Washington.

In order of importance the principal apple growing states in the Northwest are Washington, California, Oregon, Idaho, and Colorado. Small areas in other western states may be found in Utah, Montana, and New Mexico. The unusual development in all of these states reached its height during the decade from 1900 to 1910 when many important public and private irrigation projects were completed.

By ignoring state lines we find that the leading apple districts of the West are as follows:

District	Average Annual Production 1916-1919 Bushels
Wenatchee, Washington	6,686,675
Yakima, Washington	6,015,250
Watsonville, California	2,787,500
Southern, Idaho	1,894,750
Hood River, Oregon	1,625,000
Western Slope, Colorado	1,492,500
Total	30, 501,675

Important commercial sections also are found in the North Central States, notably in the lake and river valley regions of Michigan, Ohio, Indiana, Illinois and Wisconsin.

In the east, in addition to those already discussed, commercial growing districts are located in Pennsylvania, West Virginia, Maryland, Delaware, New Jersey, North Carolina, and the famous Baldwin belt in New England.

While the apple has been grown in America for the past three centuries yet it was not until the middle of the nineteenth century that it was recognized as a food product of commercial importance. It was during the years 1860 to 1875 that most of the commercial plantings were made in New York, 1885-1895 in Pennsylvania and Virginia, 1890-1900 in the Ozarks and the prairie states, and 1900 to 1910 in the western states. Very few important plantings have been made since 1910.

These numerous plantings when taken collectively reached their maximum bearing during the decade from 1910 to 1920 when the total production in the United States including the crop from the farm orchards averaged nearly 200,000,000 bushels annually. The 1914 crop was the largest on record totaling over 253,000,000 bushels, with the 1920 crop second, amounting to more than 240,000,000 bushels. Because of the small plantings during 1910-1920 it is not expected that these yields will be greatly exceeded during the next decade. It is possible, however, with the many orchards in the far west only coming into maximum production that the record commercial crop of 1920 may be exceeded.

III

Total Apple Production in the United States

There is a very marked fluctuation in the total bushels of apples produced in the United States from year to year due largely to seasonal conditions. The high record year as shown in the accompanying chart was in 1914 when the crop exceeded 253,000,000 bushels. This was more than 100,000,000 bushels above the preceding year, and only 23,000,000 bushels above 1915. Since production records have been kept there are two years in the recent history of the crop which stand out in bold relief as low crop years. They are the years 1890 and 1921, the only two in the past 33 years in which the total apple crop in the United States fell below 100,000,000 bushels.

Among the high yielding years are 1896, 1904, 1906, 1912, 1914 and 1920, the latter being second only to 1914 the year with the largest crop on record.

In general the high crop years were years when lower prices prevailed although there are numerous exceptions to this during the period of a rising price level.

Assuming the yield for the period 1909 to 1913 as a base for an average yield we find by referring to the chart that during 15 years of the past 33 the yield was above the average and during the remaining 18 years below this level. Twelve states produce about 70 per cent of the total crop. For information on yields in the most important states refer to the table in the appendix containing same for the past

five years. During this period the states in order of importance rank as follows: New York, Washington, Pennsylvania, Virginia, Michigan, California, Ohio, Illinois, Missouri, Oregon, West Virginia, and North Carolina.

In comparing states the total yield must not be confused with the commercial crop in which the states are placed in a different order. Pennsylvania, for example, drops from third to sixth place when rated according to commercial production. Apples produced in farm orchards for home use and for local markets only are not marketed in standard containers and are not included in the commercial crop. If sent to market in carload lots they usually are shipped in bulk ungraded.

This study is concerned largely with the commercial apple crop of the United States a discussion of which follows.

Table 1--

Total Apple Production in the United States[1]

Bushels (000 omitted)

1889	143,105	1906	216,720
1890	80,142	1907	119,560
1891	198,907	1908	148,940
1892	120,536	1909	146,122
1893	114,773	1910	141,640
1894	134,648	1911	214,020
1895	219,600	1912	235,220
1896	232,600	1913	145,410
1897	163,728	1914	253,200
1898	118,061	1915	230,011
1899	175,397	1916	193,905
1900	205,930	1917	166,749
1901	135,500	1918	169,625
1902	212,330	1919	153,238
1903	195,680	1920	240,442
1904	233,630	1921	96,881
1905	136,220		

Average Annual Production based upon 5-year average, 1909-1913,

176,482,000 bushels

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1 Yearbook, U. S. Department of Agriculture, 1920, p. 652.

Million bushels

Million bushels

TOTAL APPLE PRODUCTION IN THE U.S. 1889–1921

260
240
220
200
180
160
140
120
100

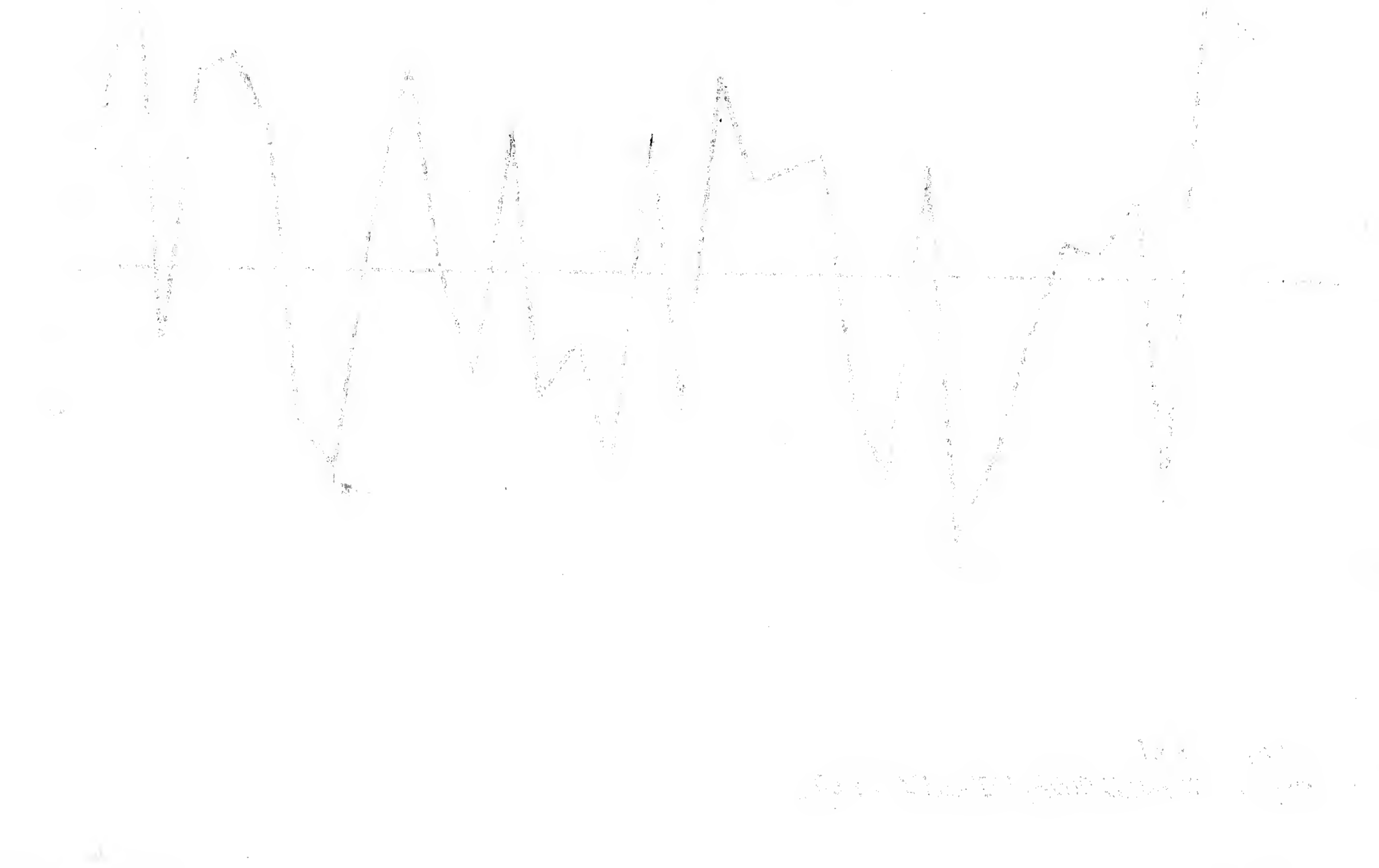
232,600

253,200

143,105

96,881

1889 1895 1900 1905 1910 1915 1920 1921 Year



The Commercial Apple Crop

The commercial apple crop always is quoted in barrels a convenient distinction from the total crop reported in bushels only. It is only within the past six years that separate figures of reasonable accuracy have been compiled for the commercial crop. The accompanying chart shows the variation in the annual production of this crop for the years 1916 to 1921 with the record commercial crop of 36,272,000 barrels in 1920. Because of the severe spring frosts in New York, Pennsylvania, Virginia, and other eastern states in 1921 the commercial crop for this year was the lowest for the period. No authentic records could be obtained for years preceding 1916.

The commercial crop usually represents 40 to 60 per cent of the total apple crop of the United States, the average for the past six years being 47 per cent. In 1921 this percentage greatly increased, as was to be expected in a low crop year, and reached the 62 per cent mark.

The accompanying statistics show clearly where our commercial apples are produced. The Pacific-Northwest leads as a region with New York dropping to second place. The Shenandoah-Cumberland Region in Pennsylvania, Maryland, Virginia, and West Virginia holds third place. In point of young trees and potential production this region

ranks above New York and rivals the great commercial apple producing section int the Northwest.

A comparison by states shows that during the past five years Washington wrested first place from New York in 1921 and 1919. With the rather conspicuous lack of young orchards in the latter it probably will not be many years before Washington will occupy first place among the commercial apple producing states 75 to 80 per cent of the time. During the same period California has occupied a place among the first five states four-fifths of the time. Virginia has a similar record, most of the time occupying third place. Other states included in this group from time to time are Michigan, Pennsylvania, Oregon, Idaho, and Illinois. Of the entire commercial crop, 50 to 72 per cent of it is produced by five states with those practicing modern methods of grading, packing, and marketing rapidly coming to the front.

Table 2--

Commercial Apple Crop in the U. S.[1]

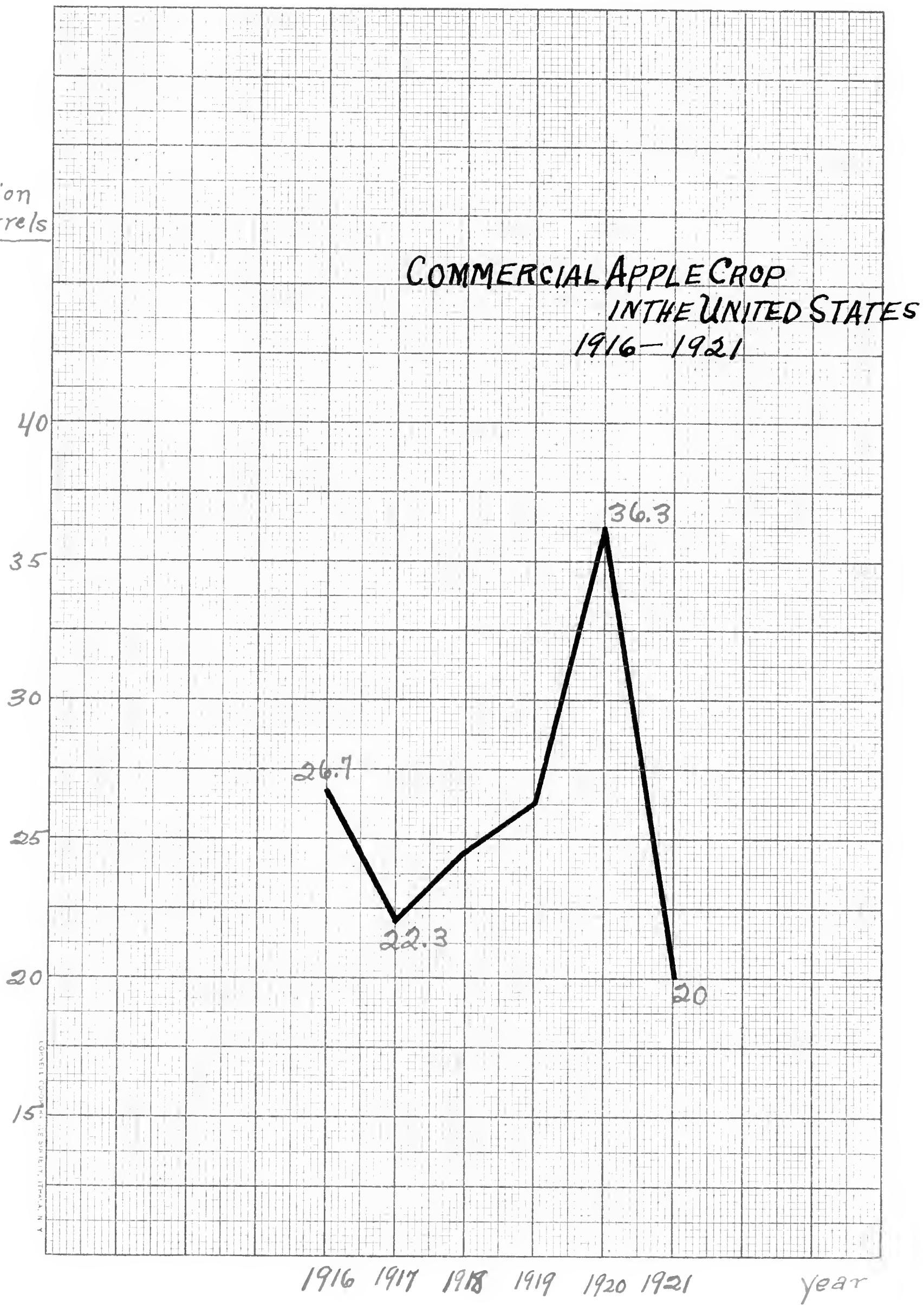
(Barrels 000 omitted)

1921 - - -	20,098
1920 - - -	36,272
1919 - - -	26,223
1918 - - -	24,743
1917 - - -	22,341
1916 - - -	26,747

1 Yearbook, U. S. Department of Agriculture, 1920, p. 653.

Chart II-

COMMERCIAL APPLE CROP IN THE UNITED STATES 1916–1921



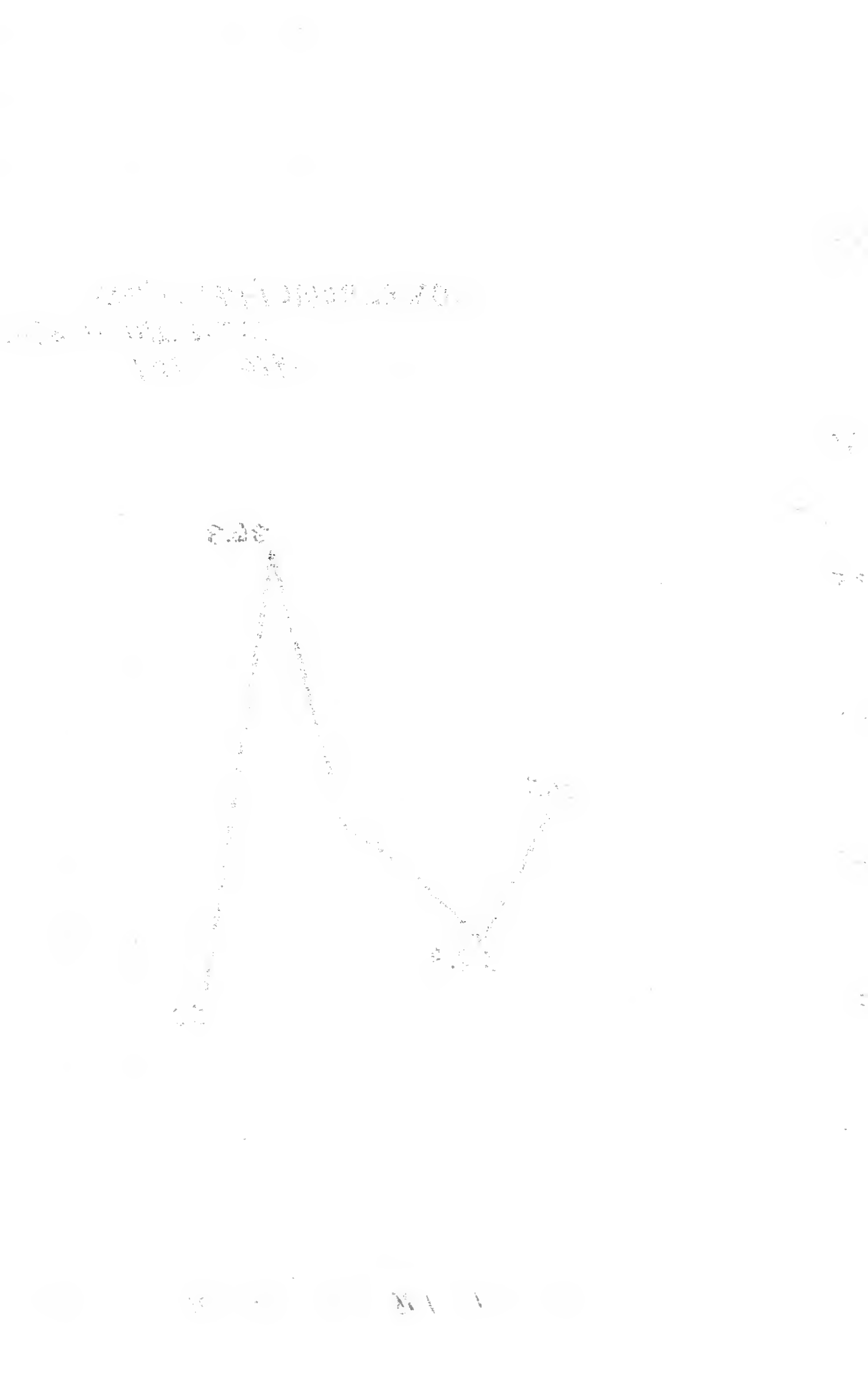


Table 3--

Commercial Apple Crop by Regions[1]

(Barrels--000 omitted)

		1919	1918
1.	Pacific Northwest	9,128	5,037
2.	Western New York	1,728	4,800
3.	Shenandoah Cumberland	1,980	2,600
4.	California	1,511	1,127
5.	Ozark Mountains	1,395	404
6.	New England	1,120	645
7.	Hudson Valley	1,050	647
8.	Western Michigan	812	760
9.	Missouri River	990	630
10.	Southern and Western Illinois	705	800
11.	Colorado	828	527
12.	Piedmont	551	465
13.	Southern Ohio	184	558
14.	Arkansas River	135	123

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1 Crop Reporter, U. S. Bureau of Markets and Crop Estimates.

Table 4--

Five Leading Commercial Apple States

for 1921, 1920, 1919, 1918, 1917

(Barrels -- 000 omitted)

1921	
United States	20,098
Washington	7,750
New York	3,000
Oregon	1,300
California	1,220
Idaho	1,227

5 States--72% of Commercial Crop

1920	
United States	36,272
New York	9,275
Washington	3,623
Michigan	3,167
Virginia	2,636
Pennsylvania	2,000

5 States--57% of Commercial Crop

1919	
United States	26,223
Washington	6,817
New York	2,975
Virginia	1,508
California	1,400
Oregon	1,357

5 States--54% of Commercial Crop

1918	
United States	24,724
New York	5,950
Washington	4,296
Virginia	1,766
Michigan	1,495
California	1,127

5 States--59% of Commercial Crop

1917	
United States	22,341
Washington	4,620
New York	2,058
Virginia	1,687
Illinois	1,554
California	1,174

5 States--49% of Commercial Crop

IV.

Production of Apples in Other Countries

Records of annual production in European and South American countries are very incomplete and practically inadequate for making reliable comparisons. On the other hand production records for Canada, Australia and New Zealand are well prepared and may be used with reasonable accuracy in comparison with production in the United States.

When measured according to the total production foreign countries may be arranged as follows, (in order of importance):

Germany
France
Austria-Hungary (1913)
Canada
United Kingdom
Australia and New Zealand
Spain
Argentina
Japan
Chile

Other apple producing countries are: Belgium, The Netherlands, Denmark, Italy, Uruguay, Mexico, Russia, Bulgaria, Roumania, and South Africa.

Germany

Practically all of the apples produced in Germany are

used for home consumption. The plantings are greatest in the mild and moist western section, particularly in Rhenish Prussia and Wurttemberg. Much of the fruit is grown for cider or beverage purposes and does not enter the world markets as fruit. Germany imports large quantities of apples in the form of ripe and dried apples, a large portion of which prior to the World War, came from the United States and France. No production data is available. In 1913, however, it was reported that Germany had 74,376,000 apple trees, including both bearing and non-bearing trees. A large part of the plantings are found along highways and in pastures, making it impracticable even to attempt an acre comparison with the apple orchards in the United States.

France

The apple industry of France is confined largely to the northern section bordering upon the English Channel. In this country, also, a very large portion, possibly 90 per cent of the crop, is used for cider and beverage purposes. Probably the principal reason for the location of most of the apple trees in northern France is due to the fact that this region is beyond the limits of vine culture. It is in Brittany and Normandy where cider, and not wine, is the traditional beverage. In southern France the apple cannot successfully compete with the vineyards. Climatic conditions also are less favorable in the southern part.

Because apples are grown largely for cider purposes

little attention is given to the selection of varieties. Yield rather than quality is of major importance resulting in inferior fruit for table purposes. France's surplus composed largely of cider apples is exported to Germany. Of the fruit imported by France very little consists of apples. The eating of apples out of season is a habit not highly developed in France. The limited demand for apples of high quality is met by training the young trees in trellises similar to those found in vineyards. These trellises frequently are found along high walls, on the lawns of residences, and bordering the vegetable and flower gardens.

United Kingdom

The commercial apple crop of the United Kingdom is grown in southern England, viz., Kent, Herefordshire, and the southwestern peninsula. The climate and soils in this region are favorable to the production of high grade table stock. Trees generally are small but produce good yields. One of the districts, Herefordshire, is famed for its production of cider apples rather than table fruit although much of the latter is grown. Excellent markets for apples are found in London and other large cities of England where the price charged at restaurants frequently amounts to one shilling (nearly 25 cents). It is in these cities where the United States finds its best market for surplus apples.

Canada

Canada has four important apple growing regions. These are found in the Lake Erie and Lake Ontario dis-

tricts, in Nova Scotia in the territory surrounding Montreal, and in the valleys of British Columbia. The soil and climatic conditions are the determining factors in the location of these orchards. It is interesting to note that the largest apple region in Canada is found on the shores of Lakes Erie and Ontario directly opposite the important apple growing region in Western New York. In 1918 this region produced nearly two-thirds of the entire Canadian apple crop. It may be noted, further, that the valley region of British Columbia lies just north of the international boundary line bordering the states of Washington. Heavy plantings have been made in this section of Canada in recent years. Irrigation is necessary because of the low rainfall in these mountain valleys.

The production by provinces in Canada in order of importance is as follows:

Ontario

Nova Scotia

Quebec

British Columbia

New Brunswick

Prince Edward Island

The normal commercial apple crop of Canada is about one-fifth that of the United States. Approximately 60 per cent of the trees were of bearing age in 1910. A large percentage of the total crop is exported most of it going to England and Scotland. Since 1909 the Canadian exports have been decreasing, dropping from 1,604,477 barrels in 1909 to 103,626 barrels in 1917, the year of the British embargo on

apples. The commercial crop has varied from 5,000,000 barrels in 1912 to 3,500,000 barrels in 1918.

Commercial production in two important Canadian provinces[1] for the years 1911 to 1919, inclusive, was as follows:

	Nova Scotia	British Columbia
	Barrels	Barrels (of 3 boxes each)
1911 -	1,734,876	75,033
1912 -	993,523	128,880
1913 -	651,390	152,127
1914 -	981,347	205,200
1915 -	613,882	331,020
1916 -	681,470	458,770
1917 -	744,730	595,135
1918 -	808,600	459,335
1919 -	1,500,000	833,333

1 Folger,J.D., Thomson,S.M. The Commercial Apple Industry of North America. The Macmillan Co. pp.87, 93. 1921.

Australia and New Zealand

Australia, Tasmania, and New Zealand are now the most important commercial apple growing regions outside the North American Continent. The crop is estimated to be about half that of Canada, and one-tenth that of the United States. The area in bearing trees is increasing. The present acreage in Australia is about 50,000 in Tasmania 25,000, and in New Zealand 15,000 acres. A very large portion of the acreage enters into the commercial crop most of which is consumed at home. England and Germany furnish the principal markets for the surplus fruit, which amounts to approximately one-fourth of the crop.

Plantings were greatest during the five year period from 1910 to 1915. It is likely, therefore, that the production will continue to increase for a number of years, especially if the orchards are properly cared for. Most of the orchards vary from 15 to 25 acres.

The harvest season comes at a time which gives these countries a marketing period when the minimum of apples from the United States and Canada are being placed upon the market. Picking starts about the middle of February and continues until the middle of April. Australian apples, therefore, are not limited to English and other European markets, but may even be shipped to the United States. The three months of heavy receipts on foreign markets are April, May, and June. In the United States there should be an active market for a limited supply during the spring and summer months. This condition pertaining to the harvesting and marketing season may cause large additional plantings and prove a great factor in the future development of the commercial apple industry in Australia, Tasmania, and New Zealand.

Of the other apple producing countries Austria-Hungary in 1913 produced approximately 18,000,000 bushels of which nearly one-third were exported to Germany.

Argentina has over a million apple trees and is an importing nation. During the period 1909-1913 the average annual imports of apples were valued at $200,000. No production data is available.

In Chile the apple crop in the year 1914 amounted to about 1,000,000 bushels, a large portion of which is con-

verted into cider. Chile is an importing country of fresh fruits.

According to production statistics for Spain, the apple crop in 1910 was equivalent to 7,043,000 bushels, largely produced in the northern provinces. The crop is largely consumed within the country. Apple exports for the years 1909-1913 averaged only $32,000 in value being very low in the list of fresh fruits exported annually.

Japan is the most important apple growing country in the far East. Most of the fruit is grown in the northern provinces. Eastern Asia is the important market for surplus fruit. Even though this country grows some of its apples on elaborate trellises, most of the orchards in the commercial sections are similar to those in the United States. The industry was started about 50 years ago when foundation stock was introduced from California. The varieties are largely American and European varieties. In 1914 the apple crop of Japan was 1,600,000 bushels. Special interest attaches to the fruit industry of Japan because of the popular belief among American fruit growers twenty years ago that the destructive San Jose scale insect was brought to the United States from this country. It has since been established that the insect likely was introduced with nursery stock from North China and not from Japan.

Russia and other countries in Eastern Europe produce some apples which are consumed largely within the country, very small quantities entering the export trade.

V

Rank of Apple Crop in the United States

Value of Total Apple Crop in 1918 --- $ 229,990,000
" " " " " " 1919 --- $ 275,463,000

Apples in 1919 ranked ninth in the list of farm crops, being exceeded in total value only by wheat, oats, cotton, corn, potatoes, hay, tobacco, and barley.

The total value of the apple crop was about three times that of rice, almost twice that of rye, and about equal to that of barley. Over a period of years the apple crop varies in rank from eighth to twelfth in value as compared with other farm crops. The greatly fluctuating yield of apples from year to year due to climatic conditions accounts for the annual change in rank. With the growth of the commercial industry in the United States the apple is maintaining an important position among other agricultural products as illustrated by the export data found elsewhere in this study.

The apple is the leading fruit both in tonnage and value of product and destined to maintain its important position among fruits. European and South American countries are rapidly expanding their demand for apples for table use and reflect a very significant trend toward increased consumption. In the United States, also, the demand for apples in the cities is growing and should prove to be an important factor in maintaining the rank of the

of the commercial apple among other food products. With the greater efficiency and increased per capita production of the American farmer a larger proportion of our population is making the city or large town its home. The percentage of rural population has been dropping rapidly from ~~a~~ decade to decade. According to the 1920 Census reports, less than 30 per cent of the population is now classed as rural. Having in mind these facts as well as the fact that our total population has greatly increased we can readily see that the market for agricultural products among the non-agricultural people must become larger each year. The apple should be included in this increased demand and should have little difficulty in maintaining its present rank among other farm products. In the five year period, 1914-1918, the estimated annual value of important farm crops in the United States was as follows:

1.	Corn	$ 2,634,804,000
2.	Wheat	1,198,737,000
3.	Hay	1,132,276,000
4.	Cotton.	1,097,039,000
5.	Oats	773,752,000
6.	Potatoes	372,239,000
7.	Tobacco	208,426,000
8.	Apples.	184,774,000

VI

Table 5--

Varieties of Apples grown

in the United States

Percentages of normal crop of all apples

1.	Baldwin. . .	13.4%
2.	Ben Davis . .	13.3%
Two varieties		26.7%
3.	Northern Spy .	6.1%
4.	Winesap. . .	5.1%
5.	R. I. Greening	4.7%
6.	Jonathan . .	3.6%
7.	Rome Beauty .	3.1%
8.	Early Harvest.	2.8%
9.	Grimes Golden.	2.2%
10.	Wealthy. . .	2.2%
11.	York Imperial.	2.1%
12.	Maiden Blush .	2.0%
Next Ten Varieties		33.9%
First Twelve (12) Varieties		60.6%
All Other Varieties		39.4%

Other Varieties producing more than one per cent of the total crop in order of importance:

Oldenberg, Red Astrachan,

Fall Pippin, Red Limbertwig,

Yellow Newtown, Red June,

Gano, Yellow Transparent,

Stayman Winesap, Golden Russet,

Tompkins King, Yellow Bellflower,
Fameuse (Snow), Gravenstein,
Tolman Sweet.[1]

Table 6--

Varieties of Apples
Shipped from the Pacific Northwest[2]
in 1919-1920

Variety	Carloads	Percent.
1. Winesap	8,319	25.0
2. Jonathan.	5,989	18.0
3. Rome Beauty.	4,325	13.0
4. Spitzenberg.	2,994	9.0
5. Yellow Newtown.	2,328	7.0
6. Delicious.	1,663	5.0
Miscellaneous	7,652	23.0
Total.	33,270	100.0

1 Yearbook, U. S. Department of Agriculture, 1920, p. 654.

2 Kitchen, C. W., Seifert, E. M. Jr., and Hall, Mary B.
The Distribution of the Northwestern Boxed Apples.
U.S.Department of Agriculture, Bul. 935, p.4. 1921.

Table 7--

Varieties of Apples Shipped
by the Sebastopol Apple Growers' Union,[1]
Sebastopol, California
during Season of 1921

Variety	No. of Boxes
1. Alexanders	7,401
2. Arkansas Blacks	2,810
3. Astrachans	1,087
4. Baldwins	17,744
5. Bellefleurs	6,158
6. Ben Davis	432
7. Bevans Favorites	423
8. Bietigheimers	95
9. Cook Seedlings	28
10. Delaware Reds	79
11. Delicious	70
12. GRAVENSTEINS	274,922
13. Grindstones	116
14. Hoovers	10,553
15. Jonathans	10,629
16. Kings	10,354
17. Late Gravensteins	5,749
18. Maiden Blush	178
19. Mammoth Black Twigs	130
20. McIntosh Reds	103
21. Newtown Pippins	4,769
22. Nonesuch	410
23. Northern Spy	169
24. Ortley Pippins	22
25. Pearmains	112
26. Red Cheek Pippins	563
27. Rhode Island Greenings	8,973
28. Rome Beauties	14,909
29. Rosy Reds	83
30. Skinner Pippins	329
31. Smith Cider	1,093
32. Spitzenburgs	34,506
33. Sundry Varieties	155
34. Tallman Sweets	41
35. Twenty Oz. Pippins	568
36. Virginia Greenings	450
37. Wageners	17,583
38. Williams Favorites	695
39. Willow Twigs	18
40. Winter Bananas	252
	434,761

[1] Annual Report

Distribution of Varieties by Regions

Western New York

The most important varieties in this region are Baldwin, Rhode Island Greening, Twenty Ounce, Duchess, and Wealthy.

Hudson Valley

Baldwin, Rhode Island Greening, Ben Davis, Northern Spy, and McIntosh.

New England

Baldwin, Northern Spy, Rhode Island Greening, Mc Intosh, Fameuse, and Wealthy.

Virginia

Albermarle Pippin (Yellow Newtown), Ben Davis, York Imperial, Winesap, Stayman, Delicious.

Southern Pennsylvania

York Imperial, Stayman, Grimes Golden, Duchess, Yellow Transparent, Wealthy, Early Harvest.

Ohio Valley

Rome Beauty, Ben Davis, Grimes Golden, Stayman, Duchess, Yellow Transparent, and Wealthy.

Michigan

Northern Spy, Baldwin, R. I. Greening, Ben Davis, McIntosh, Duchess, and Wealthy.

Illinois

Wealthy, Duchess, Red June, Jonathan, Stayman, Delicious.

Ozarks

Ben Davis, Gano, Jonathan, Stayman, Grimes Golden, Yellow Transparent, Winesap.

Missouri River Region

Ben Davis, Gano, Jonathan, Winesap, Wealthy.

Northwest, including Washington, Oregon, Idaho, Utah, Montana, Colorado

Winesap, Jonathan, Rome Beauty, Spitzenberg, Yellow Newtown, Delicious, Stayman, Grimes Golden, Winter Banana and Ortley.

California

Yellow Newtown, Yellow Bellflower.[1]

1 Folger,J.D., Thomson,S.M. The Commercial Apple Industry of North America. The Macmillan Co. pp.393, 393.

It is interesting to note that the two leading varieties of apples in the United States make up nearly 27 per cent of our normal apple crop and that the first twelve varieties constitute over 60 per cent of the total crop. With the growth of the commercial apple industry leading fruit growers are learning the wisdom and importance of fewer varieties, well selected as to adaptation to soils and climate, as to quality, and as to shipping and keeping qualities. With the abandonment and loss of many trees, especially in farm orchards and in commercial regions where poorly adapted varieties were planted, there should come about a new alignment of varieties in order of relative importance. Anyone wishing to set out a commercial orchard in any of the well known apple regions today need not experiment in varieties. These have already been determined through the many experiments during the last sixty years and through recent studies of market demand. The shipping and keeping qualities also have become well known to producers and merchants. The prospect-

ive grower by applying to the pomologist at his state agricultural experiment station or to the United States Department of Agriculture has at his disposal a vast store of practical information for use in determining the varieties for his orchard. Among the commercial varieties Ben Davis, Northern Spy, Esopus, and Yellow Bellflower are rapidly declining in importance. They are gradually being replaced by other varieties having a better combination of desirable qualities.

Table-8

Varieties of Apples Packed and Shipped by the Western New York Fruit Growers' Co-operative Packing Association, Inc. Season of 1921-1922

Variety	In Bushel Containers (Bu.)	In Barrels (Bbls.)	Total Quantity Shipped Bbls.
Baldwin	1419	84,472	84,945
R. I. Greening	262	6,609	6,696
Roxbury Russet	12	5,905	5,909
Northern Spy	730	3,614	3,857
Ben Davis	110	3,562	3,599
Wealthy	8548	274	3,123
Tompkins King	198	2,406	2,472
Hubbardston	783	1,026	1,287
Tolman	165	822	877
Twenty Ounce	1562	285	806
Spitzenburg	25	733	741
Maiden Blush	3059	0	686
Stark	2	556	557
McIntosh	642	185	399
Wagener	158	325	378
Gravenstein	910	7	310
Gillflower	20	302	309
Golden Russet	4	279	280
Rome Beauty	201	161	228
Fall Pippin	537	46	225
Hendrick Sweet	80	191	218
Cranberry Pippin	270	94	184
Alexander	529	7	183
Jonathan	293	85	183
Seek-No-Further	45	154	169

Table-8 Con'd.

Variety	In Bushel Containers (Bu.)	In Barrels (Bbls.)	Total Quantity Shipped
Pippin	395	34	166
Bottle Greening	6	148	150
Snow	155	97	149
N. W. Greening	213	69	140
Holland Pippin	375	9	134
Boiken	38	116	129
Detroit Red	386	0	129
Ontario	29	115	125
Canada Red	33	113	124
Bellflower	35	110	122
Swaar	29	111	121
Ribston Pippin	328	2	111
Sutton Beatuy	131	63	110
Rambo	39	94	107
Gano	29	76	86
Total 40 Varieties	21785	113360	130522

81 Miscellaneous Varieties Shipped--

A. Brandy	Greasy Pippin
Arkansas Black	Grimes Golden
Baker Sweet	Haas
Beauty of Kent	Hog Island Sweet
Belle Bond	Hulbert
Bittersweet	Hyde King

Table-8 Con'd

81 Miscellaneous Varieties Shipped--Con't

Black Twig	Jeffries
Blenheim	Jersey Sweet
Blue Pearmain	Jewett Red
Bismarck	King David
Boston Russett	Lackawaxen
Canada Russett	Lady
Colvert	Lady Sweet
Cooper's Market	Longfellow
Crab	Mann
Dutchess	Mother
English Streak	Munsey Sweet
Grand Duke	Natural Fruit
Fall Genetian	Newton Pippin
Fall Greening	Nonpareil
Flower of Genesee	Oliver
French Spitzenberg	Paradise Sweet
Gloria Mundi	Parker
Golden Sweet	Peck's Pleasant
Pewankee	Perfect
Porter	Pount Sweet
Pumpkin Sweet	Unknown
Priestly	Valentine
Red Sweet	Vandeveer
Red Streak	White Graft
St. Lawrence	Winesap
Salome	Winter Banana

Table-8 Cont'd

81 Miscellaneous Varieties Shipped--Cont'd.

Scott's Winter	Winter Pippin
Senator	Strawberry
Smoke House	Winter Sweet
Sour Sweet	Wolf River
Steel Red	Yellow Transparent
Stearns	York Imperial
Sweet Greening	York Pippin
Sweet Russett	Winter Strawberry
Twenty Ounce Pippin	

81	Miscellaneous Varieties,	Bu.--	1,927
81	" "	Bbls.-	949

Grand Total of all Varieties Shipped

Number of Varieties	121
Quantity in Bushels	23,712
Quantity in Barrels	114,209
Total Quantity Shipped (Bbls.)	122,113

VII

Apple Exports

Exports of apples, including green and ripe, and dried fruit, have shown a remarkable growth since 1896. During that year the total value of the apple exports was $3,045,586. By the year 1900 the value of exports had increased to nearly four million dollars, by 1905 to over six million, 1910 over seven million, and by 1915 to nearly 10.4 million dollars. Most of the increase in value of exports was due to the increased exports of ripe fruit which in 1896 were valued at $1,880,013 and in 1915 at $7,686,094. The value of dried fruit exported increased nearly one million dollars from 1896 to 1901. Beginning with 1902 the value varied annually from $2,000,000 to $2,500,000. Only once previous to 1915 did the value of dried fruit exported exceed three million dollars. This was in the year 1911 when they amounted to $3,851,295 or more than 40 per cent of the entire apple exports from the United States for that year.

The advent of the World War marked a very sharp decline in our apple export trade. Considered more as a luxury during the war period they suffered greatly and by 1918 were valued at only $3,500,000. This was a drop of nearly seven million dollars from the previous high mark reached in 1915.

This condition was changed with the signing of the armistice. Early in 1919 Europe as well as the United

U.S. APPLE EXPORTS 1896-1920

QUANTITY and VALUE

Thousand Barrels

Value Millions

QUANTITY

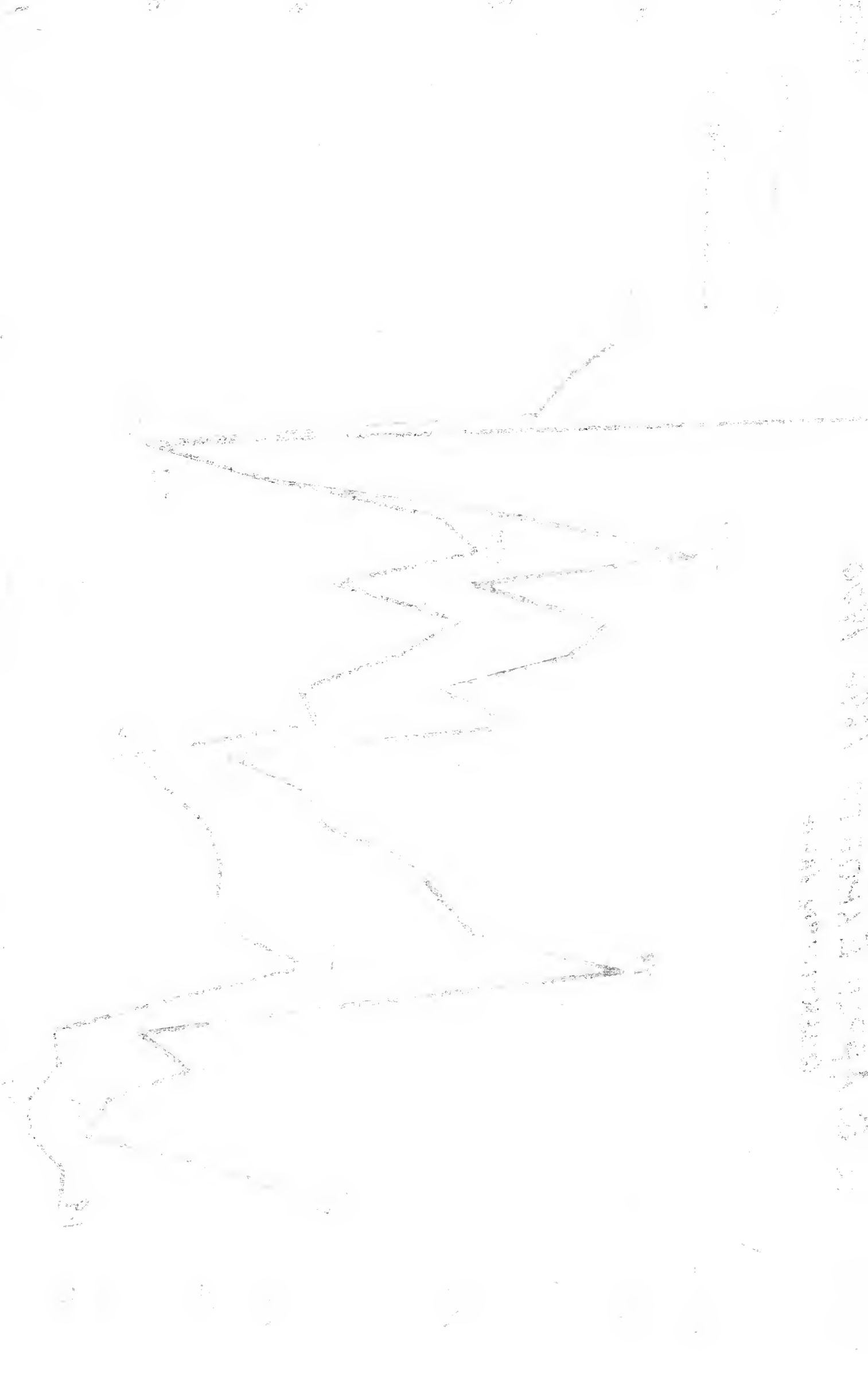
VALUE

2200
2000
1500
1000
800
500
400

14
12
10
8
5
3
1

1980
2177
1937
1138
839
579
452
14.5
14
7.7
5.8
3.1
2.9
1.9
1.4

1896
1900
1905
1910
1915
1921



States entered upon a period of unprecedented prosperity and at once began to demand, among other things, the American apple to which she had become accustomed prior to the war period. The year 1919 showed the most remarkable values in the history of the United States export trade in apples. These exports consisted of 1,712,367 barrels of apples valued at $14,471,282, and 24,704,359 pounds of dried apples valued at $4,109,282, or an aggregate value of $18,581,110. This is an increase of 45 per cent in the total value, but a decrease of 11 per cent in the quantity of ripe apples, and 36 per cent in the quantity of dried apples exported, as compared with the pre-war year 1913, when the aggregate value of exports was $10,136,603.

The accompanying tables show the fluctuations in exports from year to year as well as the values per unit. A careful study of these impresses one with the fact that the changing production due to seasonal conditions, frost injury, etc., has a direct bearing upon the price as well as the volume of exports from year to year. While the average annual crop from 1910-1920 has exceeded that of 1900-1910, yet the increase is very much less than the difference in value would indicate, nothwithstanding the fact that many new orchards in the Northwestern States have come into profitable bearing during the last decade.

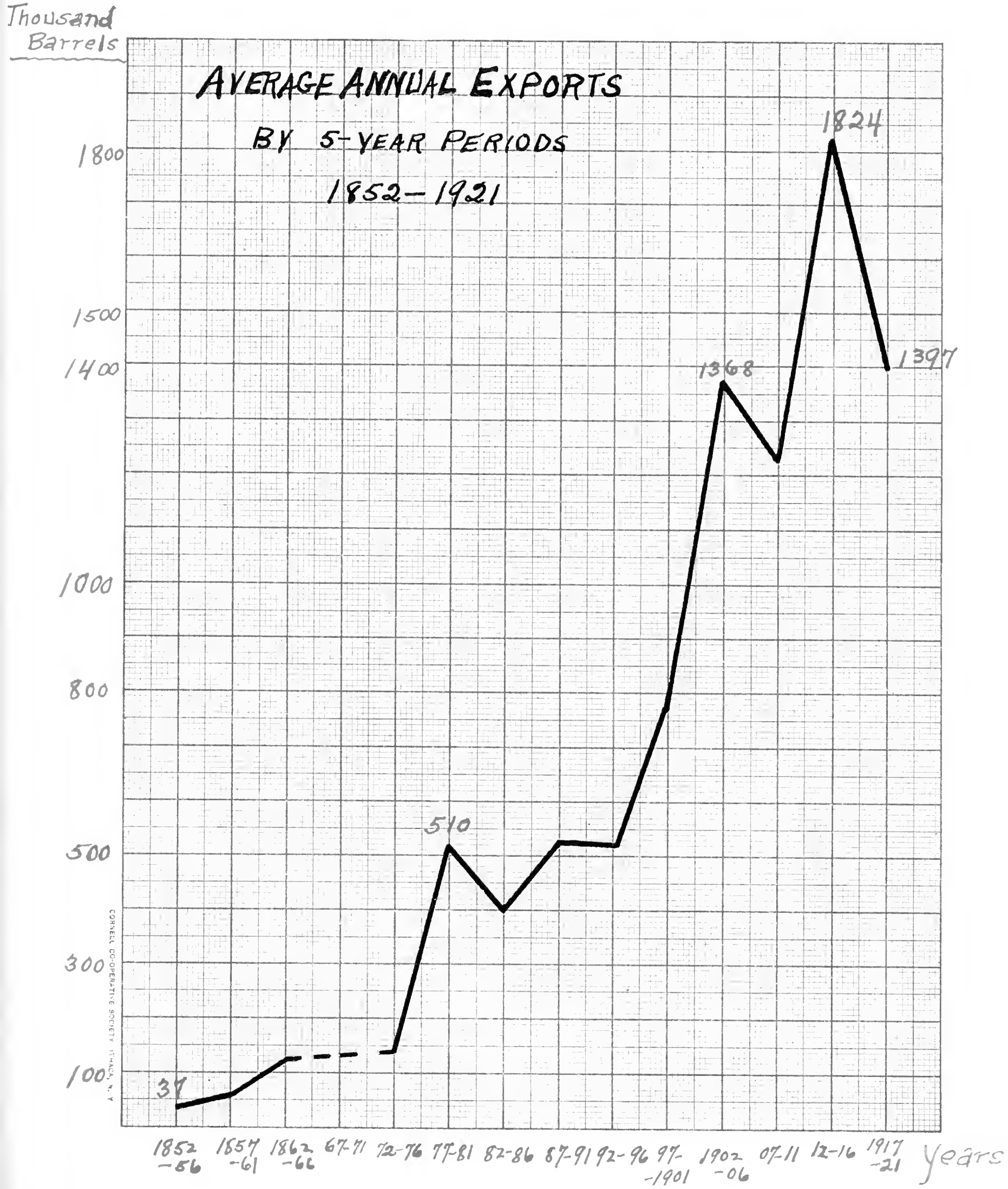
From the record high value of apple exports of $18,581,110 in 1919 there was a drop to $15,597,720 in 1920, and a somewhat smaller drop to $16,188,708 for 1921. The greater decline was in the dried apple exports which fell

from slightly over four million dollars in 1919 to one and one-half million in 1920. During the past year, 1921, these recovered to $2,206,843 in value as compared with the five year average 1910-1914 of $2,763,415.

The effect of the war was to reduce our apple exports, in some cases, notably Germany and Belgium, entirely eliminating the markets. Parallel with this falling-off in 1915 came great increases in exports for several years to such countries as Denmark, Norway and Sweden, lasting until the effective blockade of the North Sea in the latter part of 1917 and 1918 practically eliminated these markets. One of the accompanying tables shows the rapidly increasing exports by months for the year 1919 illustrating the rapidity with which the volume and value of exports recovered after the close of the war. In this case the high export month which normally would have occurred in November or December 1918, was advanced to February 1919 when the total exports of ripe apples for the month reached 493,996 barrels, valued at $3,792,361. For the month of March the exports were 286,979 barrels worth $2,619,902, making a total in exports of ripe apples for the two months of February and March 1919, of 780,975 barrels valued at $6,412,263. With the exception of 1912, 1913, 1915 and 1916, the exports of ripe apples for these two months in the first year following the war exceeded in value the annual exports of any year previous in the history of our export trade.

It is estimated that the combined fruit crops of the United States exceed in variety, quantity, and value, those of any other nation. This country is one of the greatest

Chart IV


Thousand Barrels
AVERAGE ANNUAL EXPORTS
BY 5-YEAR PERIODS
1852–1921
1800
1500
1400
1000
800
500
300
100
1824
1368
1397
510
37
1852 –56
1857 –61
1862 –66
67-71
72-76
77-81
82-86
87-91
92-96
97- -1901
1902 –06
07-11
12-16
1917 –21
years
CORNELL CO-OPERATIVE SOCIETY ITHACA, N. Y.

fruit-consuming as well as fruit-producing nations in the world, yet, in addition to the domestic consumption $122, 678,783 worth of all kinds of fruit were exported during the year 1919, 15 per cent of which consisted of dried and fresh apples. This percentage does not include the value of canned and preserved apple products.

During this depression period it is to be expected that the value of apple exports will continue to decline while the quantity of ripe apples should compare favorably with the exports for the past decade, excepting the two low years of 1917 and 1918. When compared with the five pre-war years, 1910-1914, they should be represented by an index number of approximately 100 in quantity, and at least 120 in price per unit.

EXPORTS OF DRIED APPLES FROM THE UNITED STATES

1896 – 1921

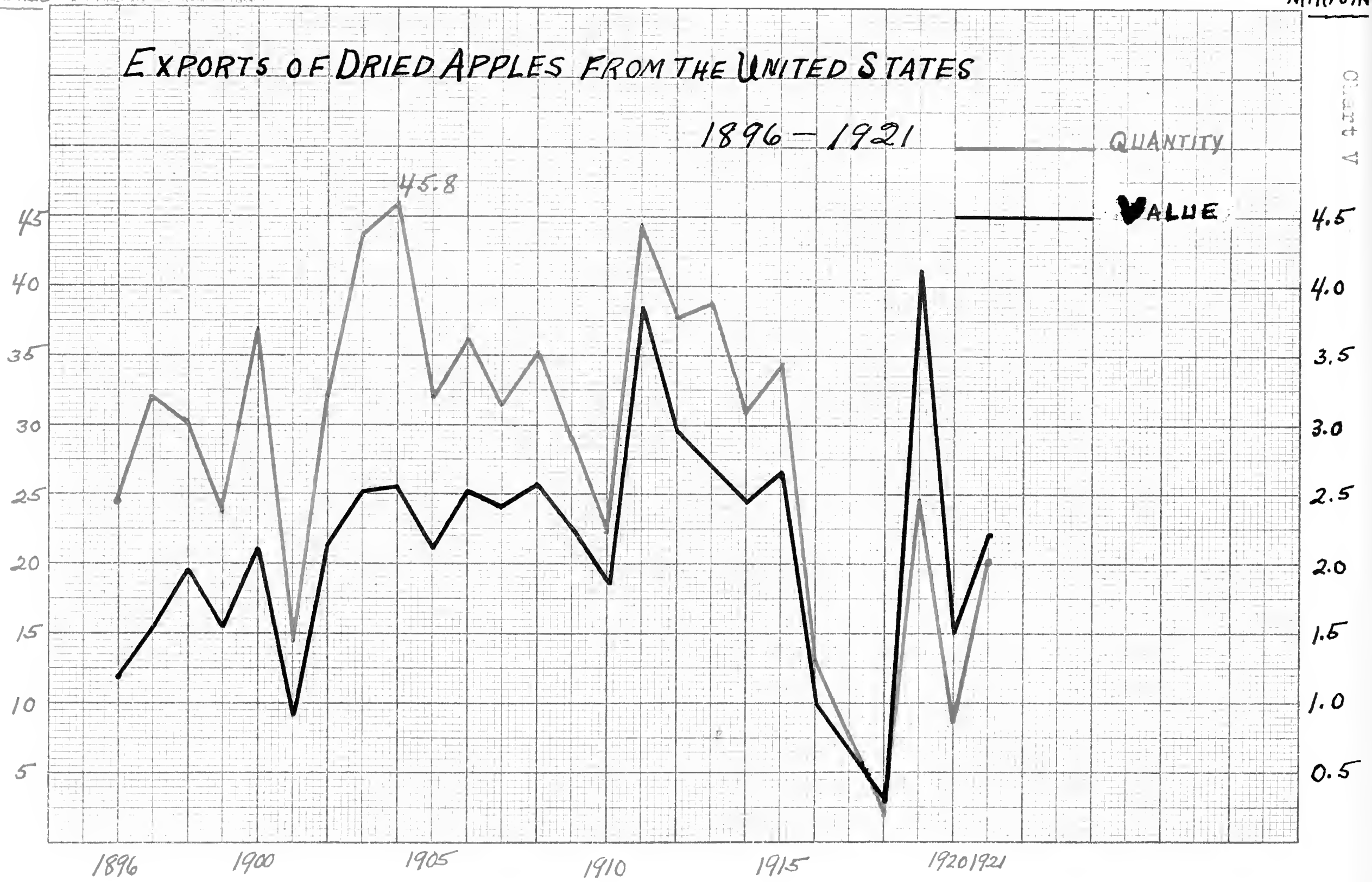


Table 9--

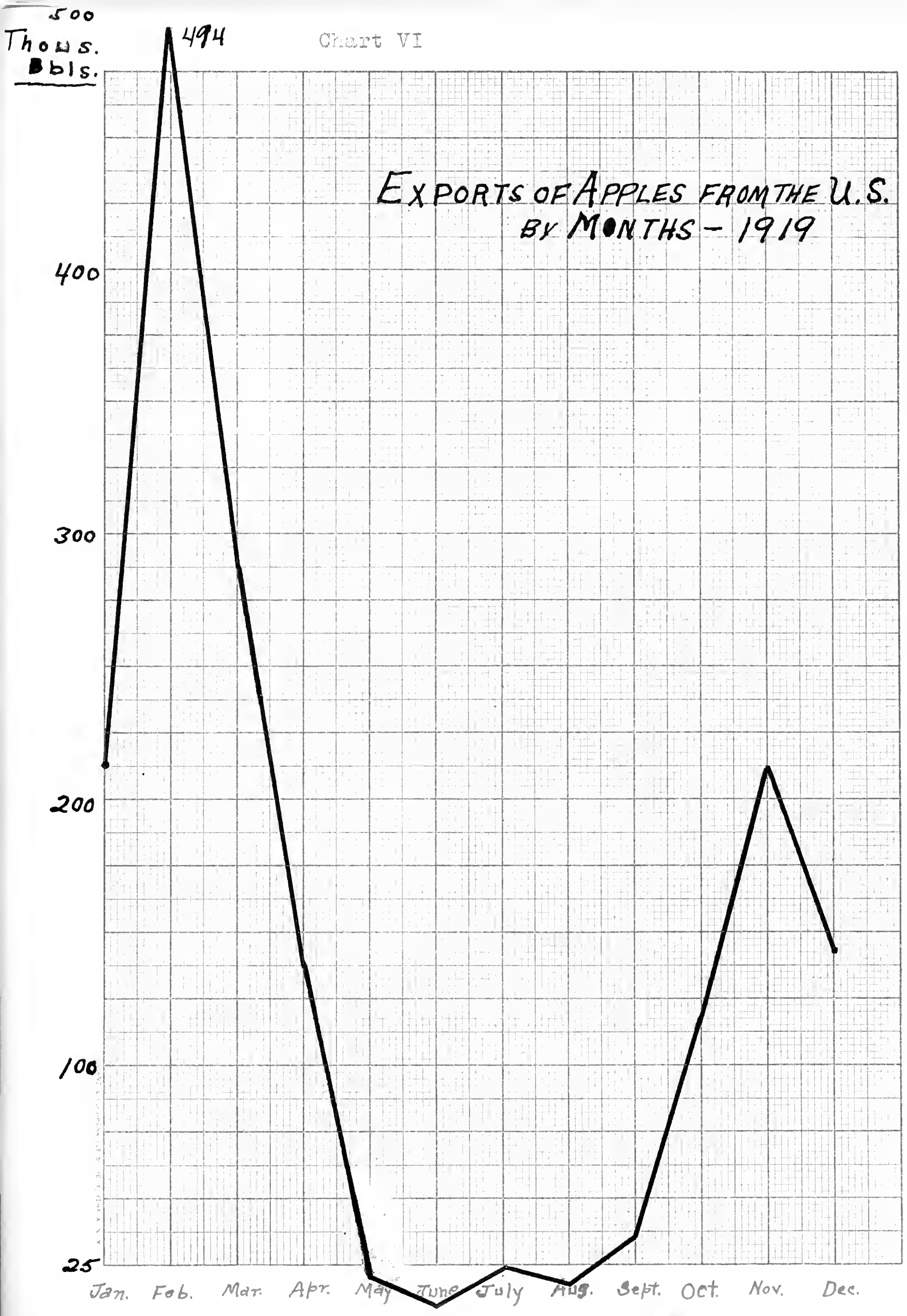
Exports of Apples by Months
1919--Year of Highest Prices

Months 1919	Green or Ripe Barrels	Green or Ripe Value	Green or Ripe Average price per Barrel	Dried Pounds	Dried Value	Dried Average price per pound
						cents
Jan.	213,107	$ 1,527,498	$ 7.17	2,306,575	$ 346,331	15
Feb.	493,996	3,792,361	7.68	1,208,392	182,193	15
Mar.	286,979	2,619,902	9.13	2,838,155	428,737	15.1
Apr.	137,409	1,455,211	10.60	7,623,924	1,073,391	14.1
May	20,747	280,747	13.36	1,178,257	219,095	16
June	8,610	101,733	11.30	2,809,427	532,470	19
July	23,450	170,164	7.25	1,562,188	299,855	19.2
Aug.	21,659	162,860	7.55	438,025	72,887	16.6
Sept.	34,619	238,780	6.90	561,773	121,405	21.6
Oct.	115,715	1,038,251	8.97	277,648	55,689	20
Nov.	213,270	1,739,297	8.15	1,815,234	343,561	18.8
Dec.	142,806	1,344,478	9.40	2,084,761	434,214	20.8
Total	1,712,367	$14 ,471,282	$ 8.45 Av.	24,704,359	$4, 109,828	16.6 Av.

Total Value (Ripe and Dried Apples) of Exports -- $18,581,110.

Chart VI

EXPORTS OF APPLES FROM THE U.S. BY MONTHS - 1919



Export Varieties

Up to the present time the favorite export varieties have been Yellow Newtown, York Imperial and Baldwin. In England a preference is shown for the yellow varieties, dating back to the quality of the famous Albemarle Pippins (Yellow Newtown), shipped from the State of Virginia. In the Scandinavian countries the red varieties command the best price, including Baldwins, Kings, and Ben Davis, all marketed in barrels. Few green or cooking apples are demanded in these northern countries.

The box-packed apples in greatest demand are Jonathans, Spitzenberg, Winesaps, and Arkansas Blacks. The western box pack is preferred. This preference for box-packed apples may be attributed to the fact that they can be shipped more safely and are more likely to arrive in a satisfactory condition. Boxed apples also are better adapted to handling for inland transportation.

The following varieties have proved very well adapted to the export trade:

Barreled	Boxed
Baldwin	Yellow Newtown
Yellow Newtown	Winesap
York Imperial	Jonathan
Ben Davis	Spitzenberg
Rhode Island Greening	
Gano	

- VIII -

Important Foreign Markets

The important foreign markets for apples are located in Northern Europe, Canada, Mexico, and South America. During the shipping season of 1920-21 the principal ports of destination in Europe were Liverpool, London, Glasgow, Manchester, and Scandinavian ports. Before the war Hamburg and Bremen, Germany, were important markets, but to date have barely started to recover. The past five years have shown a great increase in demand for American apples in Mexico, Brazil, Argentina, and Cuba. To some degree Australia, New Zealand, China and the Philippine Islands have demonstrated their ability to absorb some of our surplus apples. It is hoped that these markets can be extended as better facilities and channels for marketing the fruit in these newer countries have been developed. Since the harvest season in Australia, Tasmania, and New Zealand comes about six months later than that in the United States considerable quantities of fresh fruit are imported by these countries in off seasons. This market can be further developed and be made to serve as an additional outlet for apples from the Western States and Canada.

During the past the United Kingdom has been our best customer taking one million and more barrels annually. The largest exports to this country were made in the fiscal year 1915-1916 totaling 1,747,396 barrels. The year 1904 was second with 1,553,341 barrels, and the calendar year 1921 third with a total of nearly one and one half million

barrels. Canada furnishes our next best market frequently taking more than 300,000 barrels annually. Our greatest volume of exports to Canada were made in the fiscal year 1913-1914, totaling 377,000 barrels of apples.

Since the disappearance of the German market for apples Norway has become the third most important market for American apples. During the past three years the average annual exports to Norway totaled nearly 100,000 barrels.

At the present time South America gives the greatest promise of becoming an important market for apples, a market as yet largely undeveloped. Reduced costs in getting our apples to these distant markets will be the greatest factor in bringing about a demand for this fruit. At present the high costs, by the time a package of high grade apples reaches these foreign markets, puts the price out of reach of many who otherwise would consume them. A special effort is being made by exporters of fruit to ship by the consignment method and thereby decrease the costs and profit per package, giving the consumer the benefit of a lower price. Since a large number of vessels with refrigeration facilities are sent to Argentina for cargoes of fresh meat it is planned to utilize the cold chambers for the shipping of apples southward. This opportunity to profitably utilize what otherwise would be lost space is expected to justify lower ocean freight rates resulting in a price to the consumer which will encourage increased consumption of apples.

In order to assure the safe transportation of apples to South America it is necessary that the fruit be care-

fully selected, graded, and packed. Only fruit classed as "Fancy" or "Extra Fancy" should be used. For this market the box package is preferred for the reason that fruit arrives in much better condition than when packed in barrels.

Another potential demand for American apples exists in the far east, notably in China. With one-fourth the population of the world this country whose people are great lovers and consumers of fruit should present one of the most probable fields for the extension of our export trade. These facts combined with the increased wage-earning capacity of the Chinese laborer and improved transportation facilities, will enable a large proportion of the people to enjoy what in the past have been considered as luxuries beyond their reach. The high quality of the American apple as compared with its principal competitors of low quality from Japan and Chosen, will prove of special advantage in the development of this market with almost unlimited possibilities.

Table-10

Barrels of Apples Exported to Important Countries during 1919, 1920, and 1921

	1921 barrels	1920 barrels	1919 barrels
United Kingdom	1,498,839	1,250,033	1,209,855
Canada	166,410	374,358	158,859
Norway	80,233	67,434	147,586
Sweden	13,465	14,432	34,950
Denmark	28,638	12,982	33,281
Mexico	42,017	37,925	23,565
Cuba	33,569	32,263	26,548
Argentina	9,829	32,688	15,159
Brazil	13,760	24,656	16,880
Panama	7,042	7,701	
Australia	2	3,766	
Netherlands	4,101	3,092	
Germany	1,569	50	
Philippines	10,634	11,026	15,682
All Other Countries	26,116	25,305	30,002
Total	1936,324	1,797,711	1,712,367
Per Cent Exported to the United Kingdom	77.4	69.5	70.7

In 1919 the United States exported 1,209,855 barrels of apples to the United Kingdom alone, and 158,859 barrels to Canada. A large portion of the latter is exported to Europe and not consumed in Canada. In this year our exports to Norway were 147,586 barrels.

No other country received 100,000 barrels or more of our apples during 1919. In studying the accompanying tables it is interesting to note the growing importance of the Northern European countries especially Norway and Sweden, as well as Mexico, and the two South American countries, Argentina and Brazil, in our export trade. For example, the exports to Norway have had a consistent growth from a value of $9,000 in 1910 to $1,697,000 in the year 1919. The value of the latter, however, was greatly increased by the effective war blockade of the preceding year, 1918, when no apples were exported to Norway. The value of our exports to this country in 1920 was $778,000, Norway continuing as our third most important market.

Prior to the World War, Germany was the second largest market for our apples. For the present, however, this market has disappeared. As soon as the rate of exchange and general economic conditions reach a more stable level, Germany should again become an important market for American apples. Were it possible to place our apples on foreign markets at a price comparable with that paid by our consumers at home there would result a greatly increased demand for this fruit. After shipping them 3,000 to 5,000 miles the transportation and added merchandising charges have added much to the price and frequently have put the fruit in

the luxury class and out of reach of many prospective consumers. Any movement tending toward the reduction of these added costs in the form of lower ocean freight rates and greater efficiency in marketing should bring about a wider market for our surplus apples and prove of great benefit to the industry.

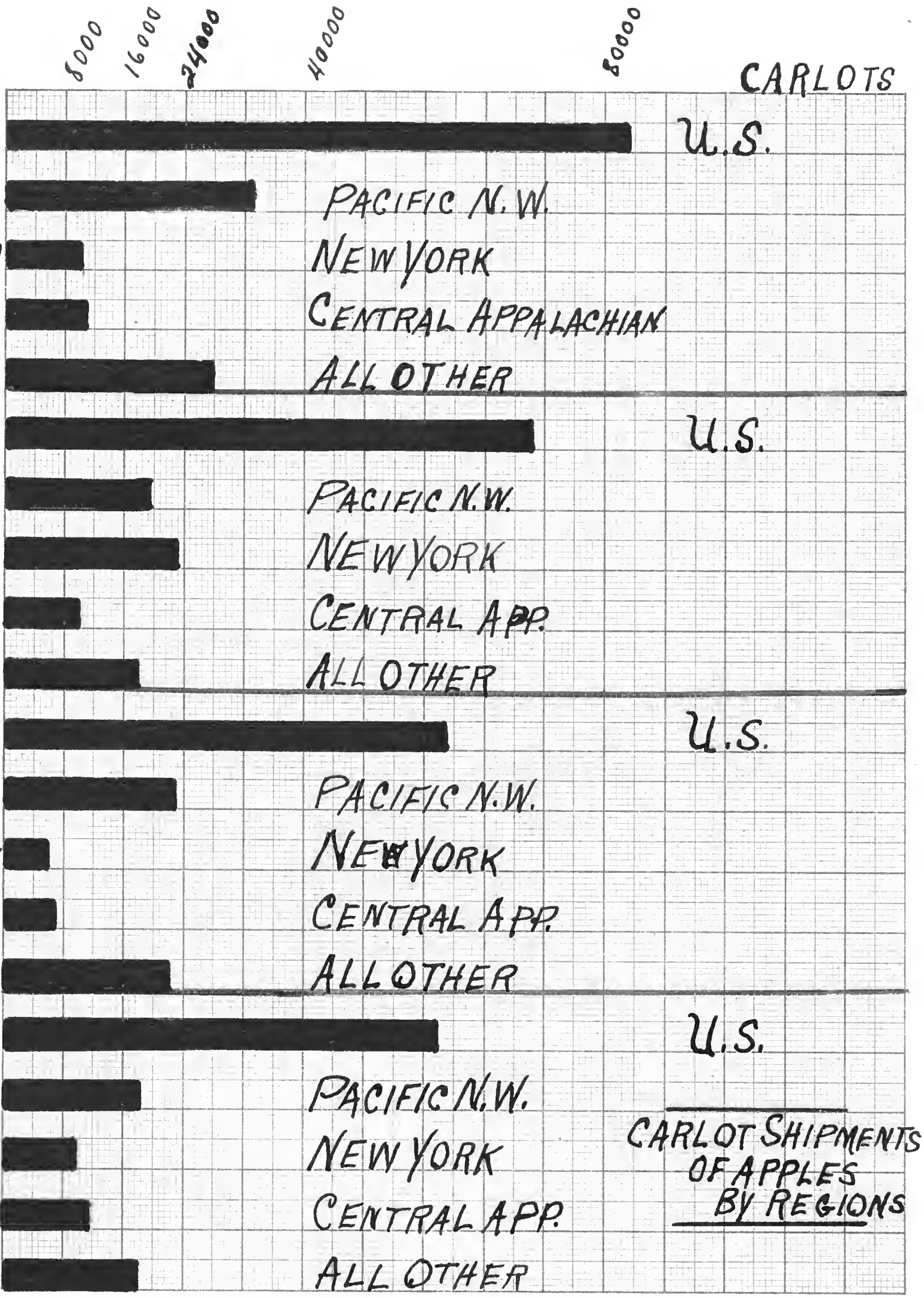
IX

Car-load Shipments of Apples

The primary or car-lot distribution of the annual apple crop of the United States is a large undertaking and requires extensive market machinery to move the crop without serious loss and waste. The importance of an efficient organization is obvious when we remember that the bulk of the crop is moved during the two months of October and November. It is during these months that the railroads have great difficulty in supplying the necessary cars to move the apple crop to the large markets, to the seaboard, and to the great central storage warehouses at important railroad centers. The average annual shipments for the five years from 1916 to 1920 were approximately 75,000 carloads. A large number of these cars had to be moved during the busy crop moving season when other crops such as potatoes, cabbage, wheat, and oats were demanding their allotment of freight cars. In 1919-20 according to a study of the monthly movement of apples in the Pacific Northwest, 60 per cent of the cars were shipped during October and November. This required 22,000 cars for this region alone during that time. Assuming fifty-three business days during the two months, we find that an average of 415 cars would be needed at the sidings of the various packing houses each day to be loaded and started toward their destinations .

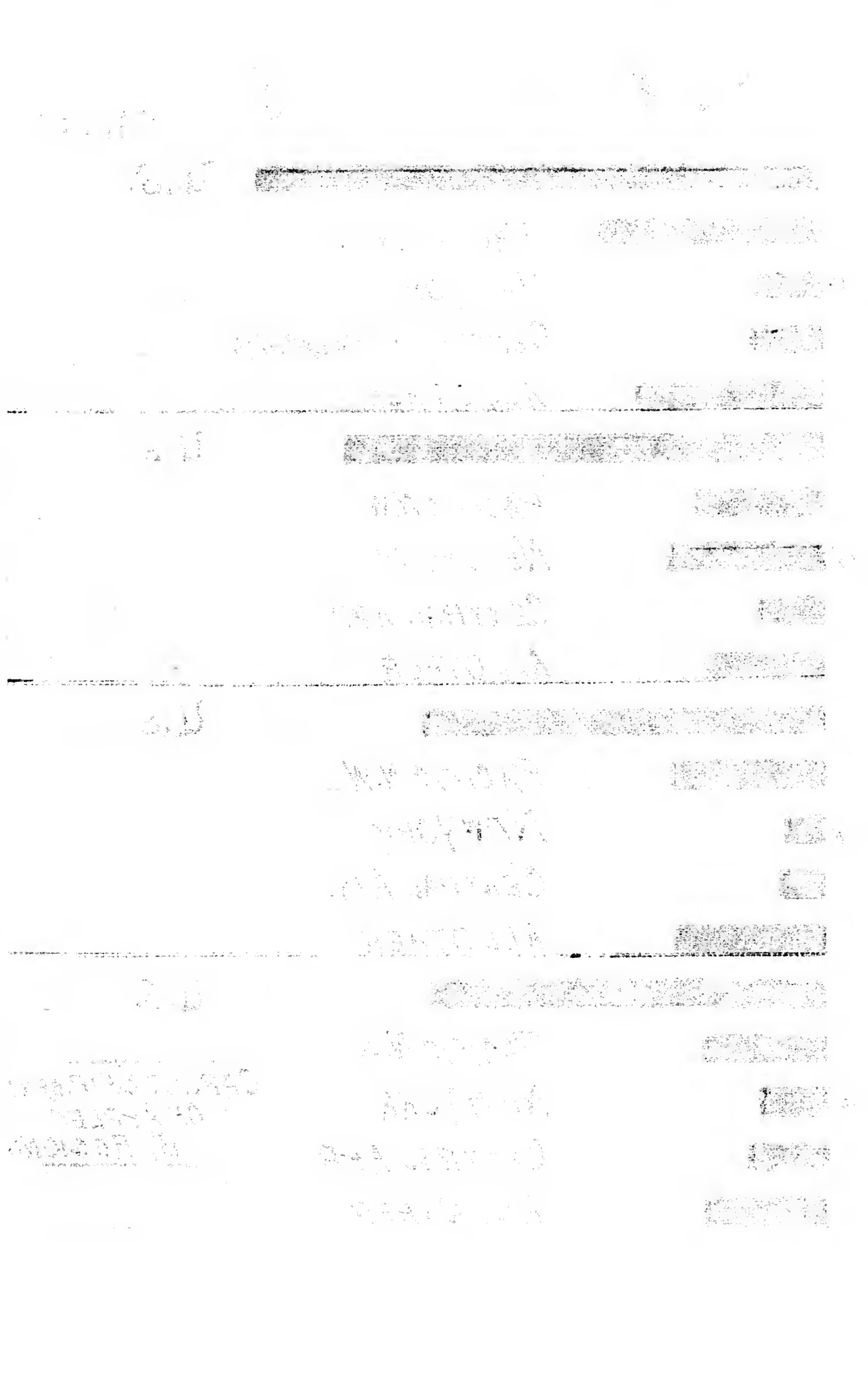
Similar problems have arisen in the eastern commercial apple growing regions from year to year. Where com-

Chart VII



CARLOT SHIPMENTS OF APPLES BY REGIONS

CORNELL CO-OPERATIVE SOCIETY ITHACA, N. Y.



mercial orchards are located near large centers of population as in the Hudson Valley, New England, Western New York, Southern Pennsylvania, Southern Ohio, and parts of the central western states, the motor truck has been pressed into service during the height of the marketing season and has materially aided in facilitating crop movement during this period. Producers have realized the great need for enlarged and improved warehouse facilities in the commercial regions and have taken steps toward supplying same. Frequently gorwers have sold their fruit in bulk at a great sacrifice in price rather than assume the risk of properly packing, storing, and marketing the apple crop. The marketing of their fruit in this manner is not usually considered good business, nor does it serve as a very good advertisement for the region.

Much of the fruit is consigned in carload lots. Of the three classes of fruit, boxed, barreled, and bulk, the box-packed apples usually arrive in the best condition. Boxes can be packed to better advantage and are not subject to as much jolting back and forth in the car. Considerable more attention is being given to the loading in cars and the prevention of injury to the fruit while enroute to market.

Chart VIII

PACIFIC NORTHWEST CARLOT SHIPMENTS SEASON 1919-1920

Carloads

10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
500
100

12791
4007
3773
827
742

TOTAL
WENATCHEE VALLEY
YAKIMA VALLEY

July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. Apr. May June

1919 — 1920

GINELL CO-OPERATIVE SERVICE, INC., N. Y.

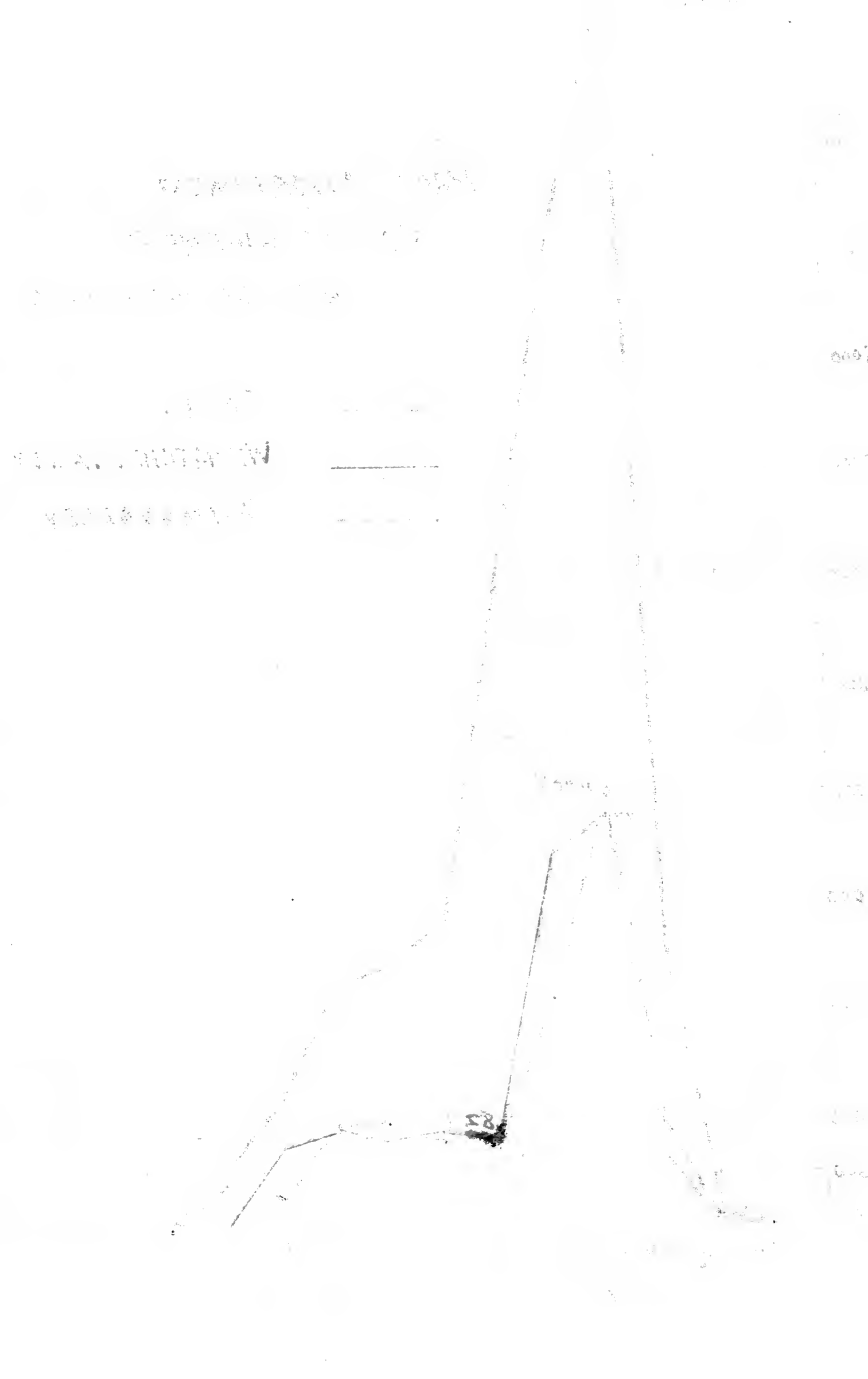


Table-11

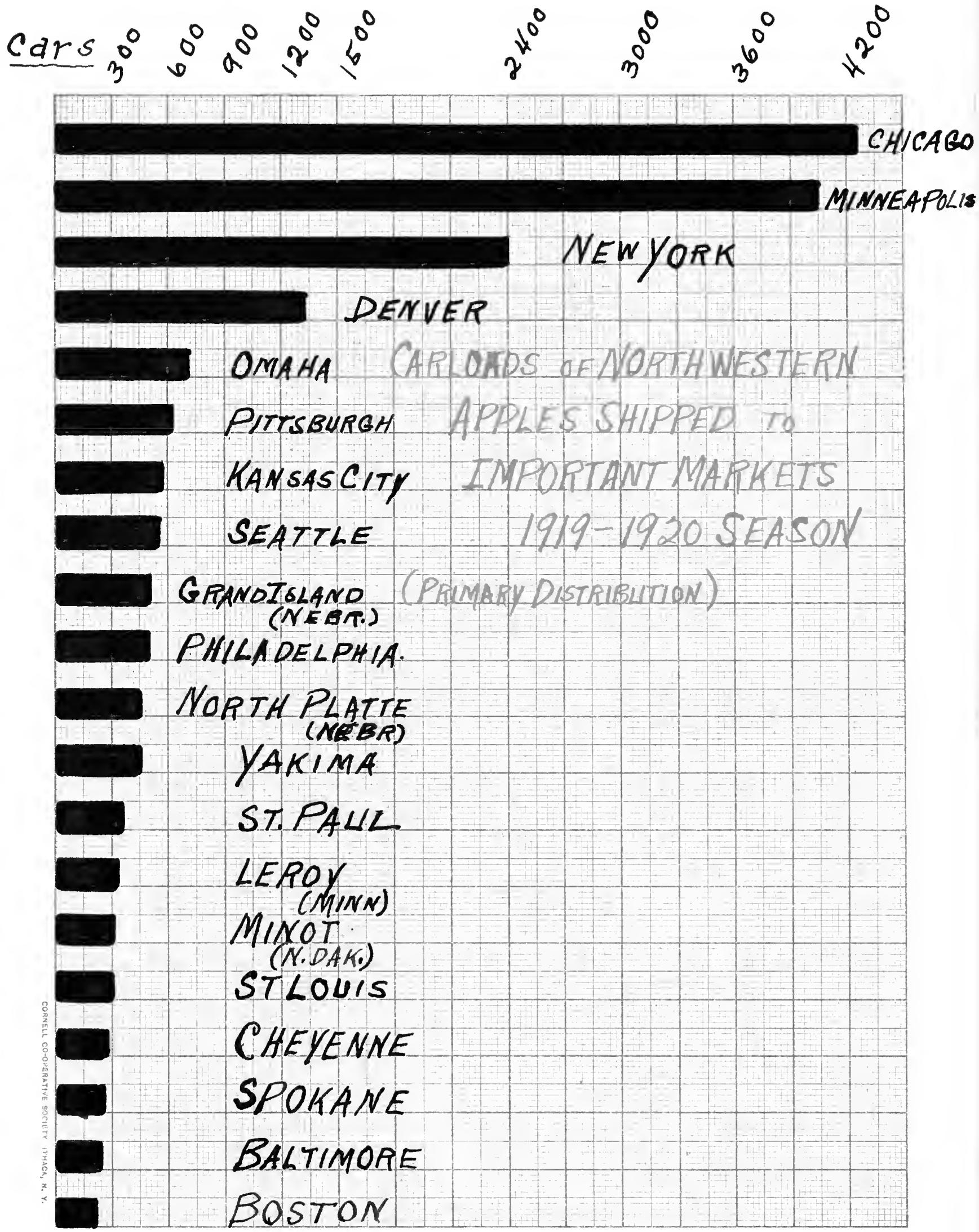
Carloads of Northwestern Apples Shipped to Important Markets

1919-1920 Season

(Primary Distribution)

Chicago	4,254 cars
Minneapolis	4,058
New York City	2,401
Denver	1,292
Omaha	700
Pittsburgh	630
Kansas City	583
Seattle	569
Grand Island, Nebraska	477
Philadelphia	471
North Platte, Nebraska	450
Makima, Washington	448
St. Paul	329
Le Roy, Minnesota	321
Minot, North Dakota	308
St. Louis	306
Cheyenne	297
Spokane	274
Baltimore	260
Boston	247
SanFrancisco	222

Chart IX



CORNELL CO-OPERATIVE SOCIETY (ITHACA, N. Y.

X

Prices Paid Producers of Apples

The accompanying chart shows the seasonal variation in prices paid producers in the United States for the ten years, 1912-1921. The greatest variation occurred in 1920 when the price reached $2.97 per bushel in July and dropped to $1.15 in December, a total drop of $1.82. The year 1914 also showed a wide variation in price, $1.42 in July and $0.57 in November.

During the entire period there was but one year, 1921, which showed a rise in price from July to November. This unusual change followed the high crop year of 1920, and was a reaction of the tremendous drop which preceded it and of the short crop accompanying it, the latter bringing the lowest on record for 31 years.

In the other nine years the lowest price paid producers prevailed during the height of the harvest season, the drop usually starting in July when the crop prospects for the year are well known by buyers and producers.

Monthly Price Paid Producers for Apples in the U.S.

1912 – 1921

Cents per bu.

300 280 260 240 220 200 180 160 140 120 100 80 60

297

59

Jan. July Jan. July Jan. July Jan. July Jan. July Jan. July Jan. July Jan. July Jan. July Jan.

J 1912 DJ 1913 DJ 1914 DJ 1915 DJ 1916 DJ 1917 DJ 1918 DJ 1919 DJ 1920 DJ 1921 D

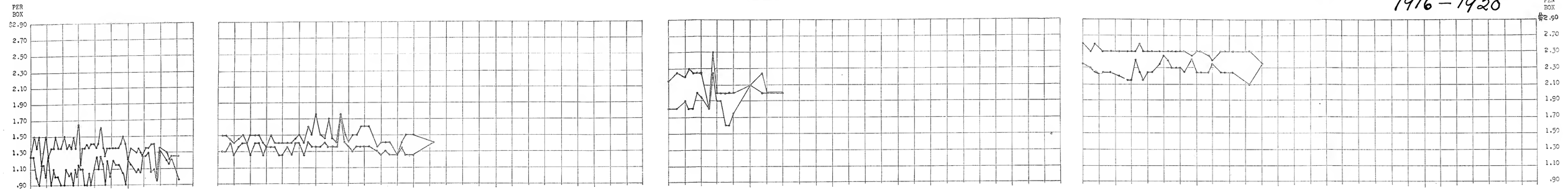
Chart X

Cents per bu. 30 26 20 16 14 12 10 8 6

Dec.

DAILY PRICE RANGE
1916 – 1920

JONATHANS



WINESAPS

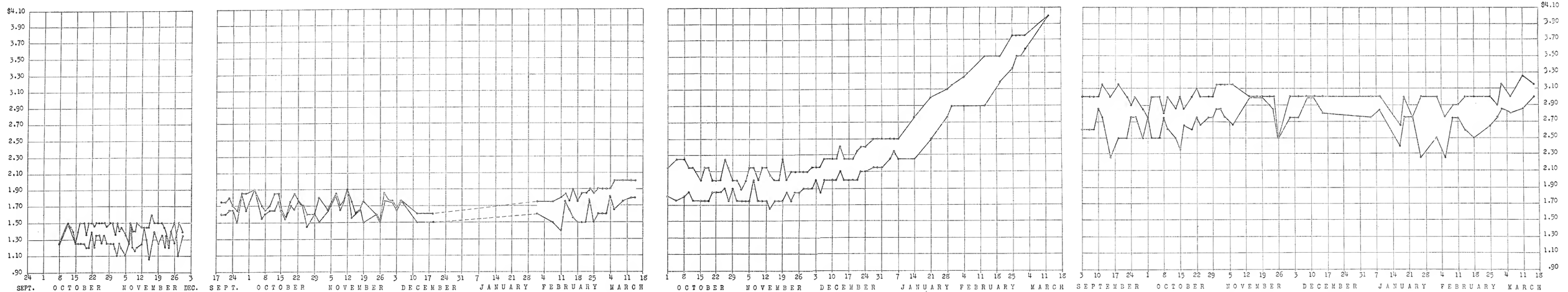


EXHIBIT No. 1.—F. o. b. prices of Northwestern boxed apples.

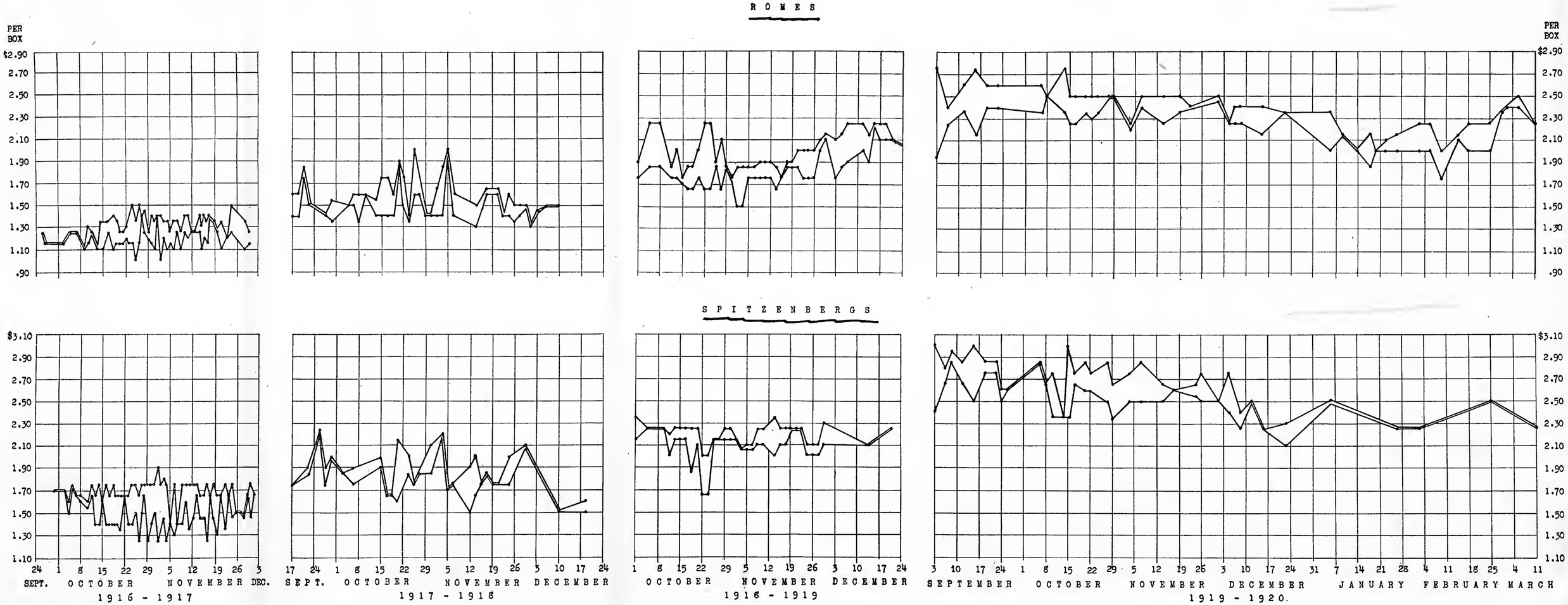
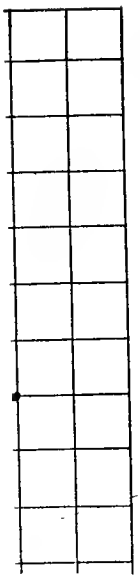
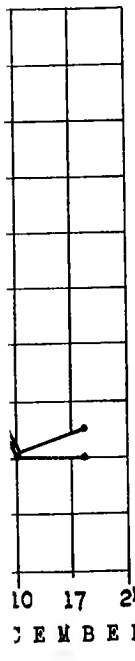


EXHIBIT No. 1 (Continued).—F. o. b. prices of Northwestern boxed apples.





Ex

Chart XI

Daily Price Range
1916--1920

Relation of Quantity of Apples Marketed to Prices

In research studies made on large markets such as New York City and Boston covering 20 to 30 years it has been found that there is a definite correlation between the quantity of apples received and the price per barrel. During the months and years when receipts were highest the price per barrel dropped below the average for the previous year of low receipts and vice versa. The accompanying charts of these two markets show this very clearly. On the New York market the average price for the second ten year period, 1903-1913, was $2.87, and for the first period, 1893-1903, $2.62 per barrel. The latter period occurred when there was a rising price level. For each year the change in price reflected the change in annual receipts of apples.

The same applied to the Boston market for which 30 years' statistics were obtained. On this market the price for the first 10-year period, 1885-1895, was $2.43 per barrel, for the second, 1895-1905, it was $2.33, and for the third, 1905-1915, $2.67 per barrel. Receipts reached their maximum in the year 1902-03 and were greatest during the second period, 1895-1905, when the average price was lowest. The third period coming when the price level was rising showed greater receipts and a higher average price than during the first period. The accompanying chart shows a definite correlation between the quantity received and the average yearly price per barrel.

CORNELL CO-OPERATIVE SOCIETY ITHACA, N. Y.

RECEIPTS AND AV. PRICES OF APPLES IN NEW YORK CITY 1893-1913

Barrels

1,500,000

1,000,000

500,000

100,000

2,044,000

3.72

3.57

1.41

QUANTITY

PRICE

Price per Bbl.

4.00

3.50

3.00

2.50

2.00

1.50

1.25

1893-94

94-95

99-1900

04-05

09-10

1912-13

Chart XII

CORNELL CO-OPERATIVE SOCIETY ITHACA, N.Y.

Barrels

RECEIPTS AND AV. PRICES OF APPLES IN BOSTON 1885-1915

QUANTITY

PRICE

Price Per Bbl.

1,200,000

1,000,000

500,000

100,000

1,259,000

4.00

3.50

3.00

2.50

2.00

1.75

1.50

1.25

1885-86

90-91

95-96

1900-01

05-06

10-11

1914-15

Chart XIII

Purchasing Power of Apples

During the entire period from 1910 to 1920 there were only two years when the purchasing power of apples exceeded the average for 31 farm products. These years were 1911 and 1914 with apples ten points above in the former and only one point above in the latter. For the other nine years apples had a purchasing power of one to twenty-eight points below that of farm products in general. The lowest purchasing power was reached during the two war years 1918 and 1917, during both of which, the total crop, as well as the commercial apple crop, was relatively low.

The index number on the other hand constantly increased during the latter half of this decade reaching the high point of 213 in 1920. The accompanying chart shows graphically how unreliable is the index number of prices received for any commodity when used independently of purchasing power as a basis for comparison. To be of real significance the price must be interpreted in units of other commodities that can be purchased by a bushel, a barrel, or ton of the product in question.

There was a decrease in purchasing power of farm products from 1910 to 1920, and an even greater decrease in the purchasing power of apples when measured by commodities which the farmer purchased. A comparison with

oranges shows that during six of the eleven years the purchasing power of apples ranked highest. These years were 1910, 1911, 1914, 1917, 1919 and 1920. Orgnges had a higher purchasing power in 1912, 1913, 1915, 1916 and 1918. For one year only, 1913, did they have a higher purchasing power than the 31 farm products. The range for oranges also is much wider, varying from 42 in 1920 to 123 in 1913, a total range of 81 points as compared with 35 for apples.

Table-12

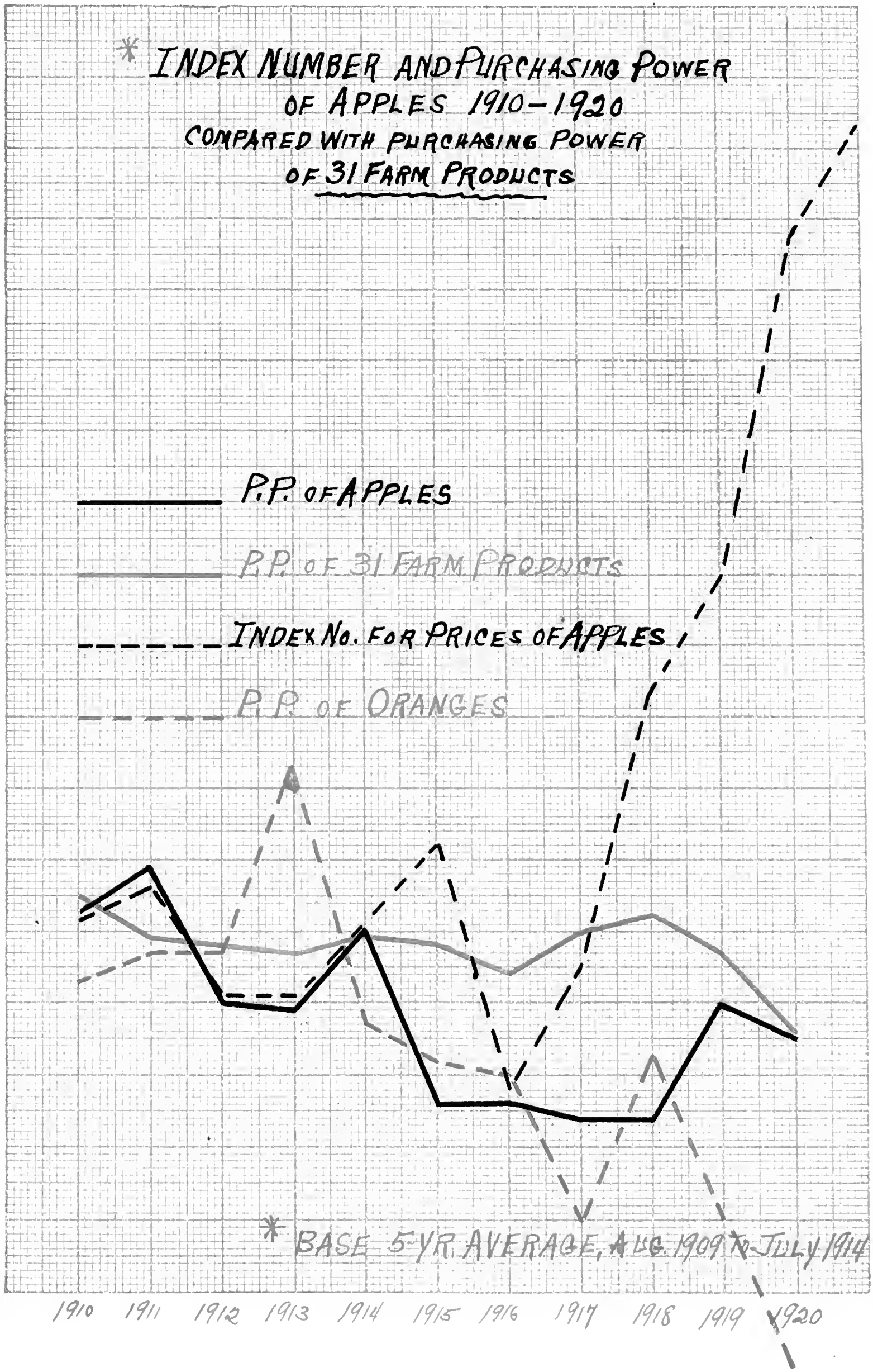
Average Yearly Price Paid Producers for a Bushel of Apples, Index Number, and Purchasing Power. [1]

	Price per Bushel	Index No.	Purchasing Power of Apples	Purchasing Power of Oranges	Purchasing Power of 31 Farm Pro-
1920 -	$ 2.08	*213	85	42	86
1919 -	1.85	197	90	60	97
1918 -	1.41	150	74	83	102
1917 -	1.26	133	74	60	100
1916 -	.91	96	76	80	94
1915 -	.73	78	76	82	98
1914 -	1.00	101	100	87	99
1913 -	.85	91	89	123	97
1912 -	.88	91	90	97	98
1911 -	1.03	106	109	97	99
1910 -	.98	102	103	93	105

*Base, 5 year average August, 1909 to July, 1914.

1 Warren, G. F. Prices of Farm Products in the United States. U.S.Department of Agri. Bul.999. 1921.

Chart XIV


* INDEX NUMBER AND PURCHASING POWER OF APPLES 1910–1920 COMPARED WITH PURCHASING POWER OF 31 FARM PRODUCTS
220
200
150
100
90
80
70
P.P. OF APPLES
P.P. OF 31 FARM PRODUCTS
INDEX NO. FOR PRICES OF APPLES
P.P. OF ORANGES
* BASE 5-YR AVERAGE, AUG. 1909 TO JULY 1914
1910
1911
1912
1913
1914
1915
1916
1917
1918
1919
1920

Export Prices

From the pre-war year 1913 there took place a gradual drop in prices of export apples for three years, with an average price per barrel of $3.80 in 1913 as compared with $3.70 in 1914, and $3.53 in the year 1915. From 1916 decreasing exports of apples were accompanied by a gradual annual increase in export prices which reached the phenomenal price of $8.45 per barrel in 1919. By this time the volume of exports had again recovered and the year 1919 not only showed the highest prices ever received per barrel, but also the greatest aggregate value of apple exports ever witnessed in the United States. The total value for this year, including the value of dried apples, was $18,581,110. For the next two years the price per barrel again declined to $7.84 in 1920, and $7.22 in 1921.

Prices for dried apples exported varied but slightly from 1913 to 1916 as shown by the accompanying table rising from seven cents per pound in 1913 to 7.8 cents in 1914 and 1915, and again dropping to 7.6 cents in 1916. During the following year the price recovered to 8.8 cents per pound. The principal factor in keeping down the export price of dried apples during these four years was the entire elimination of our best export market for this commodity, Germany. By the year 1918 the general price level had risen to such a degree that, coupled with the increased demand, the price of dried apples exported rose to 14.1 cents per pound. This

continued to 16.6 cents in 1919, and 17.1 cents in 1920, a rise of 320 to 350 per cent of the 1913 pre-war price. In 1921 the lowering price level and the still somewhat limited export market brought the average price of dried apples down to 11.1 cents per pound, approximately 157 per cent of the pre-war price, which when compared with the commodity price index for 1921 enabled the producer to purchase about the same quantity of other goods with a pound of dried apples as in 1913. The price was higher but the purchasing power about the same .

Table-13

Average Prices Received for Apples
Exported from the United States[1]

	Green and Ripe Price per Barrel	Dried Apples Price per Pound
1913	$ 3.80	$ 0.07
1914	3.70	.078
1915	3.53	.078
1916	4.31	.076
1917	4.69	.088
1918	5.40	.141
1919	8.45	.166
1920	7.84	.171
1921	7.32	.111

1 Bureau of Foreign and Domestic Commerce, U. S. Department of Commerce.

Table-14

Monthly Fluctuations in Prices
Received for Apples Exported in 1919[1]

	Green and Ripe Price per Bushel	Dried Apples Price per Pound
January	$ 7.17	$ 0.15
February	7.68	.15
March	9.13	.151
April	10.60	.141
May	13.36	.16
June	11.30	.19
July	7.25	.192
August	7.55	.166
September	6.90	.216
October	8.97	.200
November	8.15	.188
December	9.40	.208
Average for 1919 -	$ 8.45	$0.166

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1 Bureau of Foreign and Domestic Commerce, U. S. Department of Commerce.

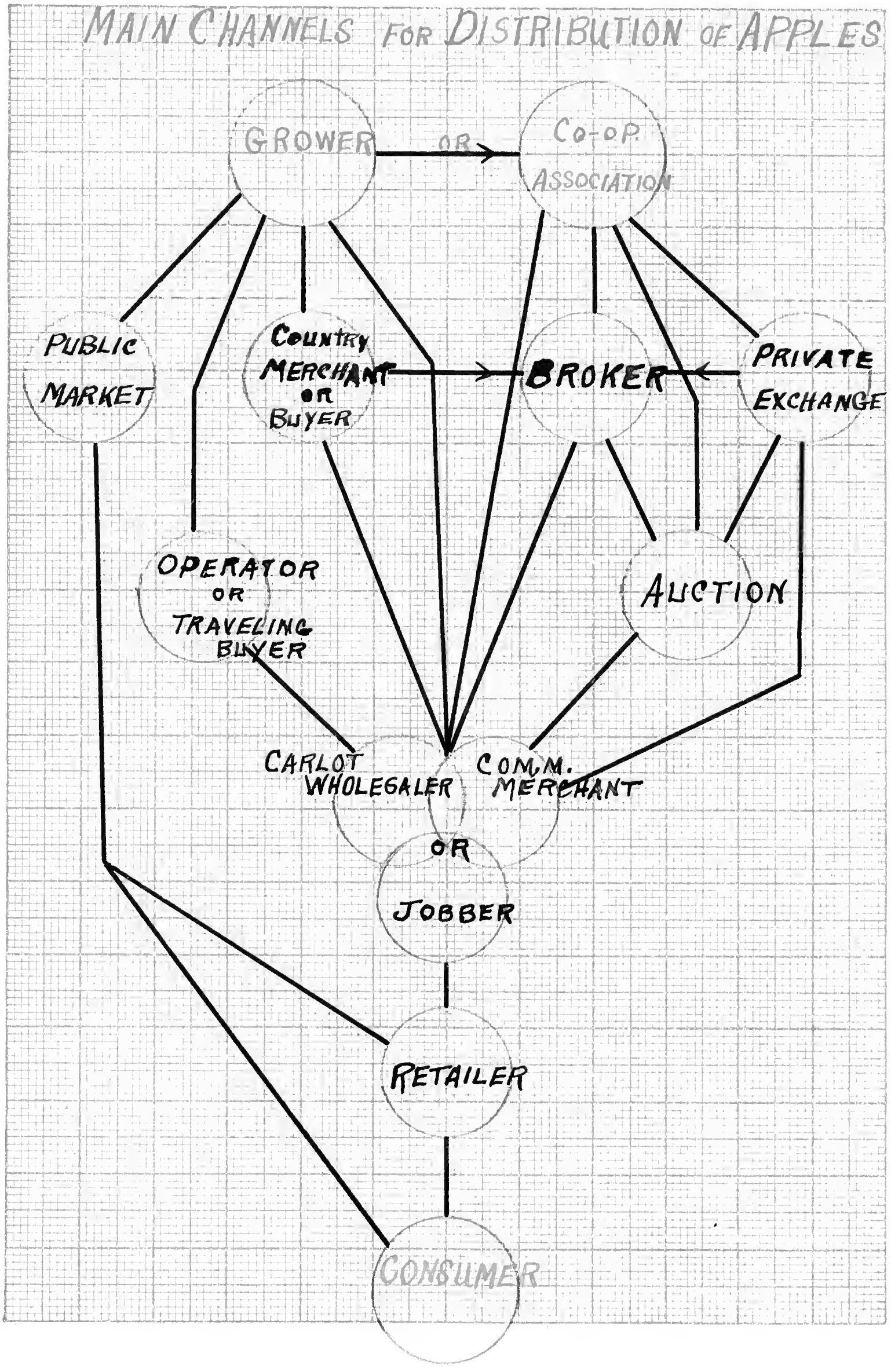
XI

Marketing Costs

Of all costs entering into the marketing of a box or barrel ofapples, that of the retailer is the highest. Usually this item exceeds all the other distribution costs combined. The number of channels through which the product passes varies greatly. Ordinarily the grower sells to the local dealer or to the fruit growers association who in turn ships to a wholesaler in the large city markets or to a broker. The wholesaler sells to the jobber or to the retailer, or in some cases direct to a large consumer. It is possible,therefore, that a barrel of apples passes through from three to six of the marketing channels before it reaches the ultimate consumer. Each of these agencies renders a service and makes a charge for same. While the intrinsic value of the apple has not been increased since the fruit left the orchard, yet the value of time and place service has been added to the commodity and greatly enhanced its price. In other words, the apple grown in the State of Washington is a different apple by the time it reaches New York and commands an entirely different price. In fact, the grower, were he suddenly to exchange places with the city purchaser at a fruit stand, would not be able to recognize his product by the price, so great has been the change.

Investigations show that a reduction in price by retailers would materially increase the consumption of apples and eventually result in equally good profits for

Chart XV


MAIN CHANNELS FOR DISTRIBUTION OF APPLES
GROWER
OR
CO-OP. ASSOCIATION
PUBLIC MARKET
COUNTRY MERCHANT OR BUYER
BROKER
PRIVATE EXCHANGE
OPERATOR OR TRAVELING BUYER
AUCTION
CARLOT WHOLESALER
COM'M. MERCHANT
OR
JOBBER
RETAILER
CONSUMER

the retailer. These reduced prices and better business practice should prove beneficial to grower, dealer, and consumer. In general, the gross profits of fruit stand vendors range from 100 to 250 per cent. Grocers catering to a high grade trade and maintaining a credit and delivery service also receive large gross profits, due partly to the fact that they are selling these services as well as the fruit itself. Those handling the cheaper grades of apples usually operate on a margin of 75 to 100 per cent of the purchase price. These include largely cash dealers such as cash grocers, peddlers and push cart men, the latter creating quite a demand by delivering the fruit at the home of the consumer. In the large cities a large quantity of fruit is handled in this way.

The chain stores in some cases also move a large quantity at low prices. These prices usually are far below ordinary retail prices and frequently return a gross profit of not exceeding 25 per cent. These sales, of course, do not include any telephone, credit and delivery service. The accompanying table shows the various costs entering into the marketing of apples by one of the 5 and 10 cent stores which in the fall of the year conducted special sales at very low margins.

Table-15

Cost of Marketing 118 Barrels of Apples Through the Medium of 5 and 10 cent stores.

	Per Barrel	Per Cent of Consumers Dollar
Grower received for Apples (on the tree)	$ 1.455	38.49
Cost of barrel, picking, grading, packing & hauling	.660	17.46
Fruit Growers Association, Selling Charges	.135	3.57
Freight, origin to destination	.416	11.00
Cartage at destination	.05	1.31
Loss to Wholesaler (Shrinkage)	.032	.84
Cost to Wholesaler	$ 2.748	
Wholesaler's profit	.208	5.53
Cost to Stores	$ 2.956	
Profit to 5 and 10 cent stores	.824	21.80
Price Paid by Consumer	$ 3.78	100.

1 Moomaw, C.W., and Steward, M.M. Apple Market Investigations. U.S. Dept. of Agri. Bul. 303, p.8. 1915.

In the preceding table it is shown that the freight charges amounted to 11 per cent of the consumers price. This charge must be added to most of the fruit sold on city markets and represents the cost of place service in our marketing system.

The following table shows the different freight rates in effect between the most important producing centers and nine of the principal terminal markets in the United States. These rates prevail for 100 pounds, or approximately 2 bushels, or 2/3 of a barrel of apples. (See Appendix).

Important as it may seem to the consumer the freight rate represents but a small percentage of the price paid by him. More important than this is the margin taken by the dealer. Any improvement aiming toward the cheapening of our system of distribution should first be directed toward this weaker link in our marketing channels.

Shrinkage

Market investigations show that the shrinkage, including decay and deterioration, of perishable products handled on our large markets averages 30 to 40 per cent of the middleman's margin of profit. It is evident that some one must bear this loss, consequently it is added to the consumer's price. It is logical, therefore, that any reduction in this loss through shrinkage will lessen the necessary margin of the dealer and make possible, either a lower price to the consumer or a larger return to the producer, or both.

Among the causes of this unusually heavy shrinkage are the glutting of our markets with perishable products through poor distribution, improper care of the product before and after it reaches the market, frequent handling, rough treatment after it reaches the retailer, and lack of proper storage and refrigeration facilities. With apples there is also a very heavy shrinkage on the farm. Frequently the farmer will allow his fruit to rot or become over-ripe because he cannot find a satisfactory market for it, or because he is too busy seeding or harvesting another crop considered of greater importance. The trouble quite often may be traced to a lack of proper market information or marketing facilities. That the losses through shrinkage could be reduced there is little doubt. There is evidence that progress is being made in this direction through concerted efforts on the part of producers organizations and distributors, especially through a more efficient use of by-products made possible by a large volume of business.

Advertising

It is only within recent years that organized and consistent advertising of apples has been practiced by growers and dealers. The immediate stimulus to an advertising campaign was supplied by the citrus fruit growers who for the past ten years have been engaged in constant advertising of orgnges and other fruits. The apple growers realized that in order to cope with their nearest competitor they must employ similar tactics to create and maintain a demand for their fruit.

In October 1919, a well planned advertising campaign was evolved by the growers of Northwestern box apples in cooperation with wholesalers, jobbers, and dealers in the box apple trade. The advance advertising was carried in the New York Packer and other marketing and fruit jeurnals calling upon the dealers to aid in "The Big Box Apple Advertising Drive." This was followed by the appearance of carefully prepared and uniform advertisements in approximately 500 city newspapers. Feature lines were as follows:

"Washington, Oregon and Idaho Jonathans."

Fresher, cheaper,

"Delight in Every Bite."

"Order a Box of Jonathans from Your Grocer Today."

"Butchers' Bills and Pastry Shop Bills Drop in Families that Eat Apples."

"An Apple a Day Keeps the Doctor Away."
"Food Value of One Apple Equal to one Lamb
Chop, Two Slices of Bread, or One Egg.
etc., etc."

Stress was placed upon the effect upon the vigor and health of children, upon the quality of the fruit, and the economy of the fruit eating habit. In addition to Jonathans such varieties as Rome Beauty, Winesaps, and Spitzenbergs were featured in the daily paper advertising.

The campaign started October 15th and was continued for a month. Statements from wholesalers and jobbers indicated that they were well pleased with the results. Many inquiries were received from consumers who wished to purchase fruit by the box and sales of box apples were greatly stimulated.

"The "Skookum Brand" is a good illustration of the policy of national advertising participated in by both grower and distributor. It demonstrates, further, the value of a trade-mark and the importance of standardization of product and package. Many growers organizations today are marketing their fruit through large distributors such as the American Fruit Growers, Inc., and the North American Fruit Exchange, and are cooperating in financing consistent advertising of their particular brand.

XII

APPENDIX

Table-16 1

Total Production of Apples

in 12 Leading States

(Bushels--000 omitted)

State	1921	1920	1919	1918	1917
New York	12,557	55,650	16,800	40,878	16,266
Washington	29,062	13,420	25,348	16,491	19,830
Pennsylvania	2,208	23,937	7,972	16,080	11,646
Virginia	708	15,210	9,950	10,068	11,778
Michigan	6,317	16,500	6,484	9,792	4,146
California	6,500	6,003	5,640	6,560	6,804
Ohio	3,390	13,193	2,806	7,005	5,760
Illinois	2,381	6,175	4,943	3,459	7,518
Missouri	480	5,082	5,773	4,245	8,070
Oregon	5,571	3,300	5,579	3,384	4 ,335
West Virginia	420	7,000	3,478	5,856	4,320
North Carolina	593	7,900	2,500	3,588	4,500
Total	70,187	173,370	100,273	127,406	104,973

1 Yearbook, U.S.Department of Agriculture 1920, p. 651.

Table 17

Commercial Crop in Important Apple States

(Barrels-000 omitted)

State	1921	1920	1919	1918	1917	1916
Washington	7,750	3,623	6,811	4,296	4,620	4,892
New York	3,000	9,275	2,975	5,950	2,053	5,544
Virginia	136	2,636	1,502	1,766	1,687	2,179
Michigan	1,203	3,167	1,109	1,495	515	1,414
California	1,250	1,000	1,400	1,127	1,174	1,174
Pennsylvania	221	2,000	759	1,116	854	1,225
Illinois	397	1,441	750	837	1,554	1,040
West Virginia	63	1,167	648	1,092	688	1,140
Missouri	30	1,033	1,127	735	1,128	675
Oregon	1,300	800	1,357	671	713	801
Ohio	360	1,363	264	902	503	747
Colorado	812	736	828	527	701	677
Idaho	1,227	781	1,058	112	873	170
Arkansas	16	724	1,020	241	409	245
Kansas	29	286	459	333	650	560

1 Yearbook, U.S.Department of Agriculture, 1920, p.653.

Table-18[1]

Commercial Production of Apples

Marketed in Boxes and Barrels

(000 omitted)

Year	United States	32 barrel States	*9 box States	$ 4 Northwest Box States
	bbls.	bbls.	bbls.	bbls.
1920	34,281	26,593	7,688	6,568
1919	26,174	14,353	11,821	9,121
1918	24,743	17,640	7,103	5,154
1917	22,467	13,914	8,563	6,313
1916	25,059	19,102	5,957	4,301

* Fruit in box states quoted in barrels.

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1 The Distribution of the Northwestern Boxed Apples. U. S. Dept. of Agri. Bul. 935, p. 3. 1931.

Table-19

United States Apple Exports

26 Years, 1896-1921[1]

Year	Barrels	Value
1896	1,137,714	$ 1,880,013
1897	881,279	1,858,117
1898	452,729	1,413,494
1899	499,638	1,381,661
1900	741,575	1,821,562
1901	599,006	1,761,394
1902	1,254,558	3,391,940
1903	1,980,879	5,251,930
1904	1,550,068	4,200,233
1905	1,453,446	4,062,700
1906	1,348,917	4,094,625
1907	1.119,212	3,906,179
1908	1,052, 996	3,296,437
1909	839,720	2,863,035
1910	1,670,295	5,456,450
1911	1,436,335	5,382,942
1912	1,813,456	6,618,938
1913	1,920,221	7,417,400
1914	1,541,361	5,695,621
1915	2,176,918	7,686,094
1916	1,670,543	7,205,766
1917	958,104	4,496,707
1918	579,916	3,135,203
1919	1,712,367	14,471,282
1920	1,797,711	14,088,733
1921	1,936,724	15,981,865
Average 1910-14- (5 yr.)	1,676,333	6,094,270

1 Bureau of Foreign and Domestic Commerce, U. S. Department of Commerce.

Table-30

Average Annual Exports
By Five Year Periods
For Seventy Years[1]

1852--1921

Barrels of Ripe Apples

1852-56	37,412
1857-61	57,045
1862-66	119,433
1867-71	
1872-76	132,756
1877-81	509,735
1882-86	401,886
1887-91	522,511
1892-96	520,810
1897-1901	779,980
1902-06	1,368,608
1907-11	1,225,655
1912-16	1,824,500
1917-21	1,396,865

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1 Bureau of Foreign and Domestic Commerce, U. S. Department of Commerce.

Exports of Apples 1913-1921

Year	Green or Ripe			Dried		
	Barrels	Value	Av.Price per Bbl.	Pounds	Value	Av.Price per pound cents
1921	1,936,224	13,981,865	7.22	19,962,000	2,206,843	11.1
1920	1,797,711	14,088,733	7.84	8,828,000	1,508,987	17.1
1919	1,712,367	14,471,282	8.45	24,704,359	4,109,828	16. 6
1918	579,916	3,135,203	5.40	2,200,483	311,350	14.1
1917	958,104	4,496,707	4.69	7,852,773	691,111	8.8
1916	1,670,543	7,205,766	4.31	13,186,467	1,002,007	7.6
1915	2,176,992	7,686,992	3,53	33,908,508	2,671,601	7.8
1914	1,541,361	5,695,621	3.70	31,027,551	2,441,094	7.8
1913	1,920,221	7,417,400	3,80	38,734,465	2,719,203	7.

Table-22

Exports of Dried Apples [1]

1896-1921

	Pounds	Value
1896	24,486,000	$ 1,165,573
1897	31,711,000	1,546,218
1898	30,098,000	1,931,859
1899	23,961,000	1,558,461
1900	36,961,000	2,134,566
1901	14,505,000	900,789
1902	32,236,000	2,147,660
1903	43,658,000	2,506,978
1904	45,806,000	2,512,325
1905	32,034,000	2,105,614
1906	36,041,000	2,497,955
1907	31,642,000	2,418,643
1908	35,055,000	2,570,921
1909	29,196,000	2,262,508
1910	22,643,000	1,847,548
1911	44,279,000	3,851,295
1912	37,748,000	2,957,936
1913	38,734,000	2,719,203
1914	31,028,000	2,441,094
1915	33,906,000	2,671,601
1916	13,186,000	1,002,007
1917	7,853,000	691,111
1918	2,201,000	311,352
1919	24,704,000	4,109,828
1920	8,828,000	1,508,987
1921	19,962,000	2,206,843
Average 1910-14 (5 yr.)	34,886,256	2,763,415

[1] Bureau of Foreign and Domestic Commerce, U. S. Department of Commerce.

Table-23

Apple Exports by Months

Six Most Important Months of Each Year.[1]

Barrels

	1916-17	1917-18	1918-19	1919-20
September	129,503	24,720	14,942	34,619
October	346,014	68,985	90,780	115,715
November	378,320	150,644	104,572	213,270
December	342,572	190,390	160,035	142,806
January	203,904	33,776	213,107	161,157
February	130,666	26,232	493,996	90,215
Total for 6 months	1,530,979	494,747	1,077,432	757,782

Note effect of World War on change in highest export month.

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1 The Distribution of the Northwestern Boxed Apples. U. S. Dept. of Agri. Bul. 935, p. 3. 1921.

Table-24

Exports of Apples from the United States

By Customs Districts for Fiscal Years Ending June 30th

	1914 bbls.	1915	1916	1917	1918	1919 bbls.	1920bbls.	1921
Maine & New Hampshire	50,279	404,968	7,391	10,059	2,724	190,193	32,274	35,427
Maryland		3,345	65,451	137,348	320	53,524	56,308	26,999
Massachusetts	342,720	499,391	416,705	446,206	1,272	411,181	250,188	198,754
New York	728,459	1,040,213	532,300	680,910	74,507	510,154	914,174	1,192,572
Philadelphia		10,437	48,369	19,036		83,648	121,560	32,686
Florida		4,884	5,947	7,510	15,806	18,531	22,987	21,908
New Orleans		6,092	7,915	12,956	20,715	10,808	6,018	7,259
San Antonio					25,814	12,749	24,704	30,526
San Francisco	49,882	45,412	48,781	43,092	21,801	13,724	23,080	25,363
Washington	114,723	107,027	71,778	46,985	51,061	25,509	74,343	118,417
Dakota	61,001	47,508	79,823	56,316	74,041	49,214	25,193	38,288
Michigan	21,447	24,854	46,887	54,498	91,382	51,399	85,147	44,388
Montana & Idaho	116,444	108,313	101,692	131,874	203,140	113,621	103,691	51,637
All Others	21,614	49,057	33,282	93,207	52,826	32,093	58,044	122,000
Total --	1,506,569	2,351,501	1,466,321	1,739,997	635,409	1,576,348	1,797,711	1,936,224

Countries to Which U. S. Apples are Exported

1919-1920 Value

	1910	1911	1912	1913	1914	1915	1916
United Kingdom	$2,155,000	$4,317,000	$3,616,000	$5,051,000	$3,113,000	$6,086,000	$3,297,000
Canada	279,000	503,000	736,000	914,000	1,040,000	739,000	859,000
Denmark	15,000	45,000	36,000	53,000	28,000	248,000	252,000
Norway	9,000	18,000	16,000	50,000	29,999	79,000	113,000
Argentina	3,000	4,000	39,000	39,000	157,000	261,000	244,000
Mexico	63,000	66,000	95,000	107,000	51,000	30,000	48,000
Brazil	32,000	47,000	81,000	62,000	125,000	142,000	157,000
Cuba	69,000	93,000	79,000	79,000	74,000	90,000	122,000
Australia	11,000	33,000	2,000	72,000	201,000	82,000	150,000
Belgium	3,000	9,000	7,000	8,000	17,000		
Netherlands	8,000	5,000	14,000	11,000	15,000	93,000	6,000
Sweden		9,000	1,174	14,000	5,000	27,000	44,000
Panama	29,000	45,000	45,000	52,000	45,000	40,000	
Germany	408,000	451,000	510,000	1,209,000	917,000		
Italy	1,360	1,021	459	6,000	23,000	3,000	200
France	1,236	4,000	8,000	11,000	20,000	3,000	9,000
New Zealand	25,000	34,000	37,000	34,000	45,000	22,000	28,000
Philippines	7,000	14,000	17,000	34,000	56,000	37,000	33,000
All Other	56,837	79,437	70,313	92,634	128,701	105,466	156,572
Total	$3,175,433	5,777,458	5,409,946	7,898,634	6, 089,701	8,087,466	5,518,772

Table-25

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Countries to Which U. S. Apples are Exported
(Continued)

1919-1920 Value

	1917	1918	1919	1920	1921
United Kingdom	$ 5,491,000	$ 10,000	$ 9,557,000	$9,788,000	
Canada	949,000	1,721,000	1,122,000	1,527,000	
Denmark	55,000	1,279	394,000	146,000	
Norway	105,000		1,697,000	778,000	
Argentina	413,000	203,000	208,000	374,000	
Mexico	193,000	334,000	194,000	333,000	
Brazil	161,000	116,000	207,000	284,000	
Cuba	13 1,000	192,000	246,000	248,000	
Australia	115,000	34,000		34,000	
Belgium			16,000	1,694	
Netherlands	731		2,000	26,000	
Sweden	26,000		457,000	156,000	
Panama		35,000	35,000	72,000	
Germany			84	545	
Italy	3,000	563		1,000	
France	47,000	51	27,000	7,000	
New Zealand	32,000		18,000	11,000	
Philippines	43,000	37,000	105,000	85,000	
All Other	214,505	129,198	186,198	216,494	
Total	7,979,236	2,813,091	14,471,282	14,088,733	13,981,865

Table-25 Con'd.

Table-26

Car-lot Shipments by Most Important Regions [1]

	1919-20 Cars	1918-1919 Cars	1917-18 Cars	1916-17 Cars
Pacific Northwest	33,270	19,276	22,984	17,693
New York	10,234	22,900	5,867	10,206
Central Appalachian	11,392	9,625	7,212	11,748
Total United States	82,514	69,552	58,534	57,821

1 The Distribution of the Northwestern Boxed Apples. U. S. Dept. of Agri. Bul. 935, p. 4. 1921.

Table-27

Car-lot Shipments by Box Regions

	1920-21	1919-20	1918-19
Washington	21,652	27,169	16,232
California	4,503	4,153	3,473
Oregon	3,169	5,443	2,246
Colorado	2,860	3,225	1,984
Idaho	2,784	3,943	536
All Others	1,329	1,658	1,110
Total	36,297	45,591	25,581

Table-28

Car-lot Shipments by Barrel Regions

	1920-21	1919-20	1918-19
New York	33,830	10,386	22,900
Virginia	8,709	7,075	4,227
Michigan	6,174	3,435	3,862
West Virginia	4,889	2,849	2,919
Illinois	3,457	2,935	3,676
Pennsylvania	3,403	1,266	1,794
Arkansas	2,666	4,553	1,065
Missouri	1,725	3,155	1,167
All Others	7,930	6,890	4,439
Total	72,783	41,444	44,049

* Carloads Shipped from Barrel Regions in 1921-22 - 29863

" " " Box " " 1921-22 - 54730

* To April,1, 1922.

Carloads of Apples Unloaded on

Ten Important Markets 1916-1920.

Year	New York	Chicago	Phila.	Pittsburg	St.Louis	Cincinnati	St.Paul	Minneapolis	Kansas City	Washington	Total
1916	10,191	5,252	3,342	3,445	3,225	1,338	589	869	953	459	29,663
1917	7,996	4,335	2,343	2,498	2,117	636	284	586	988	333	22,116
1918	11,336	4,536	2,701	2,951	1,540	1,130	410	568	709	633	26,514
1919	10,601	6,069	2,864	2,216	1,379	1,450	227	348	674	387	26,215
1920	11,058	7,102	3,217	2,792	1,612	1,617	401	464	1,006	590	29,859
Average	10,236	5,459	2,893	2,780	1,975	1,234	382	567	866	480	26,873

Table-29

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Table-30

Average December Jobbing Price

on 10 Markets

	1920 (Price per Barrel)	1919 (Price per Barrel)	1919 Box Apples January
New York	$ 4.71	$7163	$3.20
Chicago	5.23	8.41	3.03
Philadelphia	4.13	7.01	
Pittsburgh.	4.68	7.84	2.81
St. Louis	4.83	7.54	
Cincinnati.	4.87	7.86	2.74
St. Paul	5.53	8.80	3.25
Minneapolis	5,84	9.00	3.69
Kansas City	5.66	7.62	3.15
Washington.	5.52	8.09	3.83

Table-31

Jobbing Price Ranges of Baldwins on Three Large Markets

Average for Oct. to Jan. 1914-1922

(Per Barrel)

1914-15	1915-16	1916-17	1917-18	1918-19	1919-20	1920-21	1921-22
New York							
$2.75-1.65	$3.19-1.81	$3.91-2.75	$4.81-288	$6.44-4.75	$8.44-7.00	$5.19-3.94	$7.83-6.35
Philadelphia							
$2.50-1.75	3.41-2.59	4.50-3.00	5.19-3.12	5.75-4.00	8.56-6.75	4.81-3.75	7.50-633
Boston							
$2.08-1.83	2.67-2.17	3.42-2.75	4.00-3.33	4.63-2.13	7.33-6.33	5.50-4.25	6.75-5.75

Table-32 -90

Recent Weekly Receipts and Prices

on Important Markets, 1922

New York Baldwins, A 2½ inch

Barrels

Market	Cars	Prices April 3	Prices March 27	One Year Ago
		PER BARREL		
New York	51	7.50-8.00	7.50-7.75	5.25-5.50
Boston	15	8.00-8.25	7.75-8.50	5.00-5.50
Philadelphia	25	7.50-8.00	8.00	5.50-5.75
Baltimore	8	7.00	7.00	5.50
Pittsburgh	44	7.00-7.50	7.50-8.00	4.75-5.00
Cincinnati	19	8.00-8.25	8.25	5.75-6.00
Chicago	7	7.50-8.00	7.50-8.00	4.75-5.25
St. Louis	8			
WINESAPS		PER BOX		
New York	107	3.50-3.75	3.50-4.00	3.50-5.00
Boston	11			
Philadelphia	31	3.00-3.50	3.00-3.50	
Baltimore	11	2.50-3.00	3.25-3.50	2.30-2.80
Pittsburgh	20	3,00-3.25	2.75-3.25	2.75-3.75
Cincinnati	14			
Chicago	21	3.00-3.50	3.00-3.50	2.25-3.50
St. Louis	8			
Kansas City	11	3.50-3.75	3.50-3.75	3.50-4.00

Table-33

Average Wholesale Prices of Apples (All Varieties)

In New York City from 1893-1913

Year	Total Receipts Barrels	Average Price per Barrel
1893-94	235,000	$ 3,43
1894-95	526,000	2.60
1895-96	736,000	2.21
1896-97	1,427,000	1.41
1897-98	877,000	2.66
1898-99	651,000	3.25
1899-1900	922,000	2.33
1900-01	896,000	2.50
1901-02	554,000	3.72
1902-03	1,540,000	2.08
1903-04	2,044,000	3.39
1904-05	1,865,000	2.09
1905-06	1,567,000	3,30
1906-07	2,228,000	2.64
1907-08	1,688,000	3,05
1908-09	1,858,000	3,22
1909-10	1,898,000	3.18
1910-11	1,932,000	3,57
1911-12	1,875,000	2.68
1912-13	2,439,000	2.59

Average Price 1893 to 1903	2.62
Average Price 1903 to 1913	2.87

Table-34

Average Wholesale Prices and Receipts of Apples (All Varieties) in Boston from 1885 to 1915

	Total Receipts Barrels	Av. Price per Barrel
1885-86	496,000	$ 1.81
1886-87	619,000	2.00
1887-88	402,000	2.34
1888-89	545,000	1.89
1889-90	385,000	2.83
1890-91	191,000	3.89
1891-92	568,000	1.89
1892-93	575,000	2.44
1893-94	175,000	3.09
1894-95	685,000	2.03
1895-96	379,000	2.38
1896-97	1,131,000	1.27
1897-98	466,000	2.95
1898-99	418,000	2.63
1899-1900	498,000	2.33
1900-01	686,000	1.97
1901-02	397,000	3.44
1902-03	1,259,000	1.94
1903-04	1,190,000	2.45
1904-05	1,106,000	1.92
1905-06	709,000	3.11
1906-07	910,000	2.50
1907-08	750,000	2.49
1908-09	423,000	2.86
1909-1910	465,000	2.78
1910-11	760,000	3.13
1911-12	768,000	2.34
1912-13	1,011,000	2.26
1913-14	531,000	3.27
1914-15	788,000	1.95

Average Price

1895 to 1895	$ 2.42
1895 to 1905	2.33
1905 to 1915	2.67

Table-35

Marketing Costs

Freight Rates

To	Spokane, Washington		Rochester, New York		Winchester, Va.	
	Distance (Miles)	*Rate per 100 pounds	Distance (Miles)	*Rate per 100 pounds	Distance (Miles)	Rate per 100 pounds
Chicago	1835	$ 1.25	605	$ 0.31	770	$ 0.42
Detroit	2118	"	322	.245	612	.32
Indianapolis	2019	"	536	.295	664	.39
Cincinnati	2120	"	514	.275	553	.36
Pittsburgh	2303	"	286	.215	302	.24
Buffalo	2371	"	69	.115	435	.27
Philadelphia	2652	"	369	.225	223	.25
New York	2744	"	370	.225	315	.27
Boston	2868	"	428	.25	548	.295

*Rates in Effect March 31, 1920.

1 The Distribution of Northwestern Boxed Apples. U. S. Department of Agriculture. Bul. 935. 1921.

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