

# Marketing Central Oregon and Klamath Basin Late-crop Potatoes

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## FOREWORD

Find out the cause of this effect,  
Or rather say, the cause of this defect,  
For this effect defective comes by cause.

*Hamlet*, Act 1, Scene 5.

This is one of the few studies undertaken by a public research agency in which the major concern of the investigators has been to study the quality of a particular agricultural commodity as it is offered for sale to the consumer, and to determine from the examination of samples the causes for the deterioration of the quality of the product from the time of shipment from the producing area to the time the product is sold in the retail store.

For many years Oregon growers have produced a superior late-crop Irish potato. These producers established their markets in competition with producers from other states, and for a number of years have continued to maintain these markets despite the highly competitive conditions in which the producers have been forced to operate. The problems involved in maintaining the quality of a perishable agricultural commodity such as potatoes, from the time of harvest until the consumer receives it in the retail store, is no easy task. Quality deterioration is a recognized fact. The major problem of those interested in the marketing of potatoes, therefore, becomes one of retarding the rate of deterioration, thereby making possible the delivery of an acceptable product to the consumer.

An examination of the statistical data and the conclusions presented in this report should be profitable to the producers, the tradesmen, and the consumers.

WM. A. SCHOENFELD  
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# Summary and Conclusions

## SUMMARY

1. Approximately 90 per cent of the potatoes produced in central Oregon and the Klamath Basin are marketed outside the producing area.

2. Shipments from the two producing districts have exceeded 11,500 carloads in one season, of which approximately 92 per cent originated in the Klamath Basin.

3. Acreage plantings to potatoes in the Basin increased from 13,720 in 1934 to 19,930 in 1939. Modoc and Siskiyou Counties in the California section of the Basin accounted for 5,346 acres of this increase.

4. Acreage plantings to potatoes in the central Oregon district decreased from 5,223 in 1934 to 3,604 in 1939. This acreage taken out of potato culture was diverted primarily to seed and forage crops. The transfer was initiated as a means of controlling plant diseases and parasites as well as a means of avoiding loss caused by successive years of low potato prices.

5. Facilities for storing potatoes in the Basin area were normally sufficient to care for approximately 75 per cent of the annual potato crop. This seems adequate. Storage facilities in central Oregon are more than adequate to handle all of the potatoes harvested in any one season.

6. Per capita consumption of potatoes is definitely downward. Available data indicate a per capita consumption decrease of approximately 29 per cent between 1909 and 1939.

7. The natural market for Klamath Basin potatoes is in northern California. Estimates place the shipments from the Basin into this area at approximately 85 per cent of the total shipments from the Basin. Central Oregon potatoes are marketed mainly in Portland and the communities of the Willamette Valley.

8. For all practical purposes four large San Francisco carlot wholesale firms that operate as wholesalers and brokers control the bulk of the supply of Oregon potatoes in the San Francisco Bay area available for sale through jobbers and independent retail stores. These carlot wholesalers often function as brokers for the small potato dealers located in the shipping districts.

9. Jobbing dealers (less than carlot wholesalers) in San Francisco buy Oregon potatoes almost exclusively through carlot wholesale firms. These jobbers sell to retail stores and peddlers. Jobbing dealers in other California cities buy through one of the carlot wholesaler concerns or through brokers who are agents of the small dealers in the shipping districts. The rigidity of the carlot wholesaler-jobber-retailer channel for marketing potatoes in the city of San Francisco is attributable mainly to custom and to trade restrictions resulting from unionization of workers in the wholesale produce trade.

10. The larger chain stores have established connections that make them independent of the carlot wholesalers and brokers for their supply. One chain operates its own buying and shipping station in the Basin.

## SUMMARY—*Continued*

11. Three local shippers handle more than 90 per cent of the central Oregon potato crop. The volume in the area is not sufficient to warrant the establishment by wholesalers and chains of buying and shipping facilities; these concerns, therefore, buy mostly through the three established shippers in Redmond. Each of the shippers is also a dealer in feeds and seeds, and two handle farm implements.

12. Consumer demand for quality in potatoes varies noticeably in the several markets surveyed. The authors believe that a higher percentage of better quality potatoes is sold in those markets where the average unit consumer purchase is small and where a large percentage of the consumers package their own potatoes from open bin displays. In the markets near the producing sections the price on potatoes is low and a higher percentage of sales is made in the original containers, especially the No. 2 grade. In the former instance dealers find it to their advantage to buy the higher grade to minimize the loss caused by consumers sorting for quality. In the latter case the consumers who have storage facilities can buy in larger quantities and obtain a maximum of food at a low price and at the same time sort out some high quality potatoes for special purposes.

13. Breakage, light greening, dry rot, and soft rot were found in a high percentage of the samples of potatoes taken in the several markets surveyed. (Table 6). A combination of these defects that developed after shipping point inspection was of sufficient importance to cause 65.1 per cent of the samples from the San Francisco Bay markets to be below the grade designated on the original container. Comparable percentages for Portland, Salem, and Eugene were 47.6, 36.8, and 22.2, respectively. The extent to which the individual defects were sufficiently heavy to cause the samples to fall below grade is indicated in Table 7.

14. Government purchases of potatoes have increased measurably during 1940 and 1941. The bids for the government contracts have been awarded to shippers or carlot wholesale concerns that have obtained their potatoes from growers located in the peat soil sections of the Klamath Basin. Potatoes grown in the peat soil of the Tule Lake Basin sell at a price below that obtainable for equal United States grades of potatoes grown in the sandy soils of the Klamath Basin. Inasmuch as government bids are awarded on the basis of the lowest bid for a given grade of potatoes, Oregon growers have been unable to participate in supplying the government requirements. Further restrictions are placed on the Oregon grower by the requirements of the Oregon law that new bags be used for potatoes shipped from the producing area. Shippers on the California side of the Basin are permitted to ship potatoes to the seaport terminal in used bags. These potatoes are repacked in regulation wood containers at the seaport terminal.

15. Hand-to-mouth buying on the part of the urban consumers predominated in the San Francisco Bay markets. It was less noticeable in the Portland, Salem, and Eugene areas. The data indicate that the spread between the price paid to the potato producer and the price paid for the potatoes by the consumer was greater in those markets where the consumers bought in small quantities.

## SUMMARY—*Continued*

16. California jobbers were generally engaged in repackaging potatoes to meet the demand for smaller sized containers than the 100-pound sacks shipped into the markets from the producing areas. The U. S. No. 1 grade potatoes were being repacked in 15- and 25-pound cotton bags, grade marked U. S. No. 1. The California-Klamath Basin combination grade potatoes were being repacked in 15- and 25-pound cotton containers bearing the label "Klamath Gems." No grade marking appeared on these containers.

## CONCLUSIONS

Based on a study of the information obtained in the course of this investigation, the authors are of the opinion that—

1. The present markets for Oregon grown late-crop potatoes should be due for some growth within the immediate future. This expected increase in total consumption should result from the material increase in population and the greater employment of the people in the Pacific Coast states since 1939. This increase in the total consumption of potatoes will aid the present Oregon producers if a normal crop is produced, if the quality of potatoes is maintained, and if no new competing areas are brought into production.

2. Competition for the markets now served by Oregon potato growers is very severe. The ability of Oregon producers to maintain their market and to continue to derive the full benefits from their favorable cost position is conditioned by their ability to continue to deliver to these markets a quality product.

3. Carlot wholesale firms dominate the potato business in the San Francisco Bay markets. These firms are in a position to shift their source of supply for potatoes in case the conditions of supply are not favorable. Inasmuch as these firms supply the San Francisco Bay district jobbing dealers with potatoes to be resold to retail stores, a shift to other producing areas would not be difficult. This is especially true because of the absence of a strong consumer preference for potatoes from any particular locality.

4. Quality deterioration after shipping point inspection is a source of loss. Dealers figure the loss resulting from deterioration as one of the costs of handling. This cost is normally reflected in the form of a higher unit price on salable potatoes or a lower unit price on potatoes purchased from the producer.

5. The principal causes for deterioration in quality were rough handling that resulted in an excessive amount of broken and shattered potatoes; improper storage (temperature, air circulation, and stacking) that caused dry rot, and soft rot; and improper display in the retail stores in which potatoes were exposed to light for too long a time that resulted in light greening.

6. Deterioration is excessive. The investigators believe that deterioration between the shipping point and the consumer can be reduced by: obtaining the cooperation of transportation agencies; carefully instructing all employees in methods of handling the product; directing more attention and study to the storage of potatoes in retail stores; and avoiding displays that expose the product to excessive light.

## CONCLUSIONS—*Continued*

7. The present system of emphasizing the inspection of potatoes at the shipping point and in the cars in the terminal wholesale markets is a satisfactory basis for protecting the wholesale dealers and the producers. Adequate consumer protection by state and federal agencies is lacking. This condition arises primarily from the practical, administrative, and financial difficulties involved in attempting to institute inspection service for retail stores. Consumers must rely on their ability properly to select potatoes or on the ability and willingness of their local retail merchant to make available to them the quality of product they desire. Retail grocers are not especially qualified to judge the quality of potatoes or to protect the quality of the potatoes in their possession.

8. There is some indication that burlap and paper containers afford better protection to potatoes than do cotton containers. While the results of the samples are in no respect conclusive, there is a definite tendency for light greening to occur more frequently in cotton containers than in burlap or paper. This subject is of sufficient economic importance to the industry to deserve further investigation.

9. The authors feel that exclusive of waste from deterioration, the cost of marketing potatoes is not out of line with the cost of the services rendered by the dealers. Hand-to-mouth buying by the urban consumers has increased the costs of marketing by shifting risks and financing to the producer or to the middleman. While the producers of potatoes may not consider this type of consumer purchasing to be to the consumer's or to the producer's advantage, there are many factors to indicate that the consumer in following a policy of hand-to-mouth buying is choosing the most efficient method of purchasing, considering his financial position and his mode of living.

10. The possibility is not promising for obtaining a market for central Oregon and Klamath Basin potatoes in the more densely populated sections of the Midwest, South, and East. Competition from producing areas nearer to these markets precludes the possibility of any substantial profits from such an undertaking. It is believed, however, that limited quantities of fancy and extra-fancy potatoes can be shipped into certain midwestern and southern markets at a price to warrant the heavy shipping costs.

11. The investigators believe that Oregon producers should be permitted to ship their potatoes to terminal ports in used bags when the potatoes are to be repacked to meet the requirements of the army or navy. Permits for such shipments can be granted without conflicting with the Oregon Potato Trading and Marketing Act of 1939. In light of market conditions now prevailing, it is recommended that permits be granted to growers who are shipping potatoes to terminal markets for repacking to meet government contract provisions.

12. Government buying is becoming a factor in the potato market. The authors believe that this demand will prove beneficial to the price structure provided the industry continues to place on the market a high quality potato. Excessive shipments of inferior quality potatoes under market conditions that have prevailed during the past four years will result in a substantially lower unit return and a possible total net return to the producers.

## CONCLUSIONS—*Continued*

13. The investigators found that the reputation of the Klamath Basin potatoes was suffering as a result of the questionable trade practices carried on by a few jobbing firms engaged in repackaging California combination or commercial grade potatoes. Growers in Modoc and Siskiyou Counties in California have been permitted to ship a combination pack to markets within the state since 1940. The county commissioners of these two California counties resorted to the use of the California permissive grading standards to aid their growers in marketing potatoes that would not have passed the inspection requirements for a U. S. No. 1 or U. S. No. 2 grade product. All such potatoes are shipped out of the area in bags bearing a Klamath label but without any grade marking. Many of these potatoes are repacked by jobbers in small containers without grade designation and sold to the retail dealers as U. S. No. 1 or No. 1 products. Other lots of combination grade potatoes are placed in U. S. No. 1 or No. 1 grade marked bags and billed to the retail dealers accordingly. In the repackaging operations a deliberate falsification of the grade contained in the repacked lots of potatoes was in evidence. Stenciling of the grade mark "U. S. No. 1" or "No. 1" on the original 100-pound containers was found in a few instances.



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## INTRODUCTION

THIS report is based on a survey and study of the methods of marketing central Oregon and Klamath Basin potatoes. The purpose of the study was to determine the extent the marketing methods affected the quality of the product offered to the consumer and the manner in which the marketing methods influenced the character of consumer demand and the cost of marketing.

The investigators were particularly concerned with the efforts of the industry to supply the consumer with a quality product. To aid in solving this problem the Experiment Station undertook a survey of retail stores to determine the quality of potatoes offered for sale to the consumers and to discover, if possible, the principal causes for the deterioration in the quality of the product offered for sale to the consumers. Inasmuch as all potatoes shipped out of the two producing districts must pass inspection at the time of shipping, it was possible to determine, with reasonable accuracy, the nature and extent of the defects in potatoes that developed between the shipping point and the retail store counter.

The cooperation of the Oregon State Department of Agriculture was obtained to carry on the work of sampling and grading potatoes in the retail stores. An experienced and regularly employed inspector from the Department was assigned to the Station for this work. The same inspector was used in each of the markets surveyed. The grading of samples was conducted in the same manner as that employed at the shipping stations. To insure uniformity in grading practices the inspector assigned to the survey visited the shipping point grading stations and graded potatoes for shipment prior to going into the retail markets. The county, state, and federal officials engaged in inspection and standardization work in California made available a representative from the San Francisco office to facilitate the work of the Oregon inspector in the California markets.

A study of consumer buying habits as indicated by the nature of consumers' purchases of potatoes in the retail stores disclosed certain preferences that have been analyzed in considerable detail. A fairly representative break-

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down of the components of the price paid by the consumers indicates reasonably well the cost of marketing through the several channels available for the distribution of the product.

## PRODUCTION

**Location of principal late-crop potato producing areas.** Available governmental and private estimates indicate that the 1940 Oregon production of 8,510,000 bushels of Irish potatoes is a record for the state. This production was estimated at slightly more than 2 per cent of the total Irish potato production for the United States. (Table 1).

Although some potatoes are produced in each of the Oregon counties, there is a fairly definite concentration of the production area in Crook, Deschutes, Klamath, and Malheur Counties. Malheur County is mainly an early-crop potato producing area. For this reason it will not be considered in this report. The three other counties produced approximately 60 per cent of the 1939 Oregon potato crop. This was done on approximately 43 per cent of the total state potato acreage (Table 2). Klamath County produced slightly more

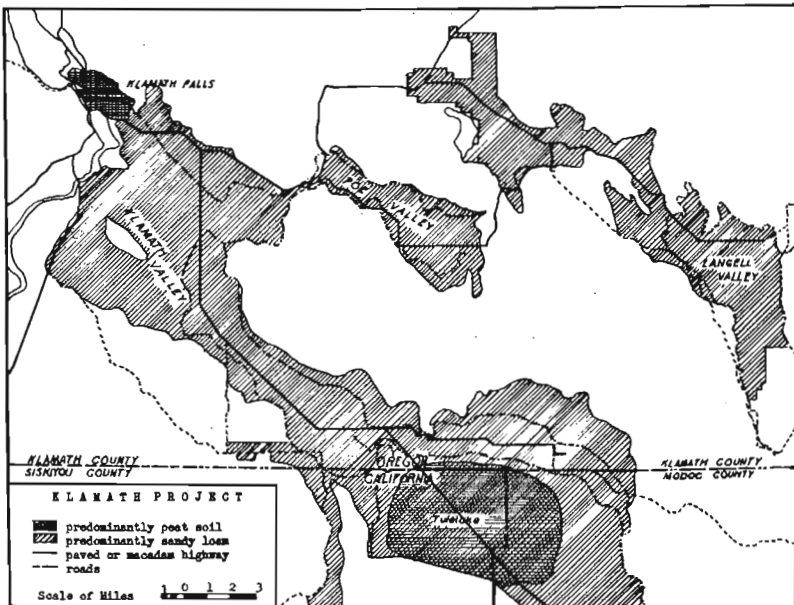


Figure 1.

than 49 per cent of the potatoes grown in Oregon in 1939. This was done on 33 per cent of the total state potato acreage. Crook and Deschutes Counties, known as the Central Oregon district, together produced 10.8 per cent of the 1939 output on 11.1 per cent of the state acreage. These central Oregon counties have shown a material decrease in production and acreage since 1934. This condition has been caused by a shift to seed and forage crops. Whether the

change in cropping practices will be permanent is dependent on the relative price of potatoes and the ability of the growers to maintain on the market a high quality product.

The Klamath County producing area is a part of the Klamath Basin irrigation and drainage project (Figure 1). The project includes areas in Modoc and Siskiyou Counties in northern California, a section of the project that has been developed since 1927. The location by counties of the potato producing acreage and the annual production in the Basin is best illustrated in the following tabulations:

Table 1. POTATO PRODUCTION IN CERTAIN WESTERN STATES AND IN THE UNITED STATES, 1924-1940 AND PERCENTAGE THAT OREGON PRODUCTION IS OF TOTAL UNITED STATES PRODUCTION  
(000 omitted)

	California	Idaho	Oregon	Washing- ton	United States	Oregon to U. S. Produc- tion
	<i>Bushels</i>	<i>Bushels</i>	<i>Bushels</i>	<i>Bushels</i>	<i>Bushels</i>	<i>Per cent</i>
1924 Census .....	7,597	10,147	2,980	6,715	352,462	.85
1925 .....	7,955	13,600	3,616	7,905	296,466	1.22
1926 .....	7,175	15,170	3,816	9,540	321,607	1.19
1927 .....	8,575	24,150	4,800	11,590	369,644	1.30
1928 .....	8,480	19,504	5,043	8,100	427,249	1.18
1929 Census .....	6,489	14,305	3,364	7,188	322,416	1.04
1930 .....	7,980	25,000	5,270	8,480	340,572	1.55
1931 .....	7,800	25,520	5,980	7,905	384,125	1.56
1932 .....	6,948	22,800	5,760	8,160	376,425	1.53
1933 .....	8,640	25,530	7,360	9,360	342,306	2.15
1934 Census .....	10,884	23,801	7,485	9,253	403,420	1.86
1935 .....	11,760	22,360	5,670	7,920	386,380	1.47
1936 .....	12,985	22,260	7,310	8,010	331,918	2.20
1937 .....	18,156	30,380	7,840	9,400	394,139	1.99
1938 .....	19,800	28,750	7,740	7,568	374,163	2.07
1939 Census .....	18,597	26,605	6,031	6,488	318,256	1.90
1940 .....	22,740	32,860	8,510	8,325	397,722	2.14

Sources: United States Census and Estimates by the Agricultural Marketing Service and Bureau of Agricultural Economics, United States Department of Agriculture.

Specialization in potato culture creates production and marketing problems. Maintenance of quality is essential if the potato growers in central Oregon and the Klamath Basin are to continue to market more than 90 per cent of their crops outside the producing districts. There is some indication that the quality of late-crop potatoes shipped to market from these areas should be the major concern of the members of the industry. The intensive use of much of the land in the two districts for potato culture has given rise to several production problems that affect quality of the products available for market. Disease and parasites common to potatoes have become of increasing importance in the sections of the producing districts that have been planted to potatoes for a number of years.

Special attention is being given to the producing problems of the potato industry by the county agricultural agents, agronomists, entomologists, and plant pathologists of the Oregon Agricultural Experiment Station. These studies have yielded tangible results. Crop rotation and the increasing use of soil building cover crops have done much to reduce plant diseases and parasites and to increase soil fertility. Substantial progress has been made with the experiments being conducted to show the effect of the use of different fertilizers

Table 2. POTATO ACREAGE AND PRODUCTION IN 18 COMMERCIAL POTATO COUNTIES OF OREGON BY CENSUS YEARS 1919, 1924, 1929, 1934, AND 1939

County	1919		1924		1929		1934		1939	
	Acreage	Production	Acreage	Production	Acreage	Production	Acreage	Production	Acreage	Production
	<i>Acres</i>	<i>Bushels</i>	<i>Acres</i>	<i>Bushels</i>	<i>Acres</i>	<i>Bushels</i>	<i>Acres</i>	<i>Bushels</i>	<i>Acres</i>	<i>Bushels</i>
Baker .....	933	61,897	480	40,127	544	67,367	958	121,969	485	68,870
Clackamas .....	6,658	554,649	5,378	376,963	5,127	320,489	6,442	394,501	2,256	235,681
Columbia .....	969	114,229	861	90,468	1,007	113,518	1,670	268,095	569	70,452
Coos .....	626	103,929	589	86,592	445	67,174	796	97,994	277	36,606
CROOK .....	225	18,286	175	11,095	423	58,577	1,846	499,291	1,720	376,223
DESCHUTES .....	1,250	85,610	899	79,034	1,174	128,333	3,377	572,562	1,884	273,150
Hood River .....	490	66,943	473	65,687	324	59,058	588	106,459	120	19,669
KLAMATH .....	615	49,200	641	65,112	4,367	923,064	10,503	2,954,556	10,536	2,956,762
Lane .....	1,870	206,785	1,734	181,462	1,494	143,977	2,234	169,441	650	69,425
Lincoln .....	402	43,862	281	37,780	299	36,527	436	47,130	305	32,370
Linn .....	1,998	196,800	1,127	97,082	1,046	81,197	1,532	110,815	598	62,663
MALHEUR .....	215	18,391	1,681	372,567	497	108,961	3,145	705,311	4,507	849,541
Marion .....	5,016	429,869	4,316	317,470	3,957	215,490	2,924	156,817	1,501	140,247
Multnomah .....	3,630	345,411	2,621	321,926	2,628	268,764	2,958	353,208	1,370	208,623
Umatilla .....	1,064	65,383	1,190	110,883	1,247	126,207	2,083	159,672	896	95,047
Union .....	1,017	59,710	450	47,561	605	57,086	763	59,686	354	27,961
Washington .....	4,536	420,034	3,340	282,618	3,788	224,164	4,012	254,863	1,600	178,470
Yamhill .....	1,402	132,277	899	66,906	766	50,885	1,151	77,576	828	111,578
Total—18 commercial counties..	32,916	2,973,265	27,135	2,651,333	29,738	3,050,838	47,418	7,109,946	30,456	5,813,338
Total—entire state .....	40,055	3,538,930	31,112	2,980,386	33,039	3,364,289	52,199	7,485,201	32,229	6,031,188

and varying amounts of water on potato quality. Further research is in progress that should be of benefit to the industry is maintaining the high quality of product that has characterized these districts for several years.

**Storage and the movement of potatoes out of storage.** During a normal production season the central Oregon and Klamath Basin producers will ship between 8,500 and 9,000 carloads of potatoes to the consuming markets. The greater percentage of these shipments will go to northern California and the Willamette Valley communities of western Oregon. These shipments ordinarily begin in September and continue through May. The shipments usually reach a peak in March. The movement out of storage cellars is dependent on market conditions. There is a tendency for some of the operators to hold their stocks for a price rise in the spring months. This speculative factor often results in a disproportionate withdrawal from storage during March at which time new-crop potatoes become a factor in the market.

Storage facilities were available in 1939 for approximately three-fourths of the normal potato crop in the producing areas. The 444 storage cellars in

Table 3. POTATO ACREAGE IN KLAMATH BASIN PROJECT

Year	Klamath County, Oregon	Modoc and Siskiyou Counties, California	Basin total
1926 .....	2,001	0	2,001
1927 .....	5,704	38	5,742
1928 .....	6,000	136	6,136
1929 .....	3,971	161	4,132
1930 .....	5,189	466	5,655
1931 .....	8,572	1,281	9,853
1932 .....	7,095	1,213	8,308
1933 .....	7,481	1,558	9,039
1934 .....	10,266	3,454	13,720
1935 .....	9,822	4,613	14,435
1936 .....	9,250	6,125	15,375
1937 .....	9,800	7,900	17,700
1938 .....	11,667	7,600	19,267
1939 .....	11,130	8,800	19,930
1940 .....	11,102*	8,398*	19,500*

Source: Annual reports of United States Department of Interior, Bureau of Reclamation, Klamath Falls, Oregon.

\* Estimates.

the Basin would accommodate approximately 3,500,000 one-hundred-pound sacks of potatoes. Forty-four of the Klamath Basin cellars were classified as terminal cellars (cellars located adjacent to railroad tracks). The storage space was rented to farmers or shippers in the district. The terminal cellars had a capacity of approximately 835,000 sacks. There were 400 farm potato cellars in the Basin. The estimated total capacity of the farm cellars was approximately 2,665,000 sacks. According to county agent reports, facilities for storing potatoes in the central Oregon area had an estimated total capacity of approximately 760,000 sacks. There were three terminal cellars with a total capacity of 30,000 sacks, and 101 farm cellars with an estimated total capacity of 730,000 sacks.

## THE MARKET FOR LATE POTATOES

**Consumption trends for food products.** The food requirements and food habits of the people in the United States have undergone significant

changes since 1909. A report issued recently by the United States Department of Agriculture discloses many facts relative to the changes that have occurred in the consumption of agricultural commodities since 1909. According to the Government report,\*

"We eat less wheat and other cereals per capita, fewer potatoes and apples, less beef and veal, and drink less tea than we did in 1909. We consume more vegetables, citrus fruits, sugar, poultry and eggs, fluid milk and manufactured dairy products, especially ice cream, edible fats and oils other than lard and butter, cocoa and chocolate, and we drink more coffee. The consumption of lamb and mutton, pork and lard, butter, and sweet potatoes has varied but the general level has not changed."

The authors commented further that

"Total consumption has risen for almost all products as would be expected in a country whose population has increased from 91 million to 132 million. Although total per capita consumption has not fluctuated greatly, striking changes have occurred in many items."

The report does not attempt to establish any one factor as the dominant reason for the existing trend in the consumption of farm products. Consideration is given, however, to a few factors that seem to have a material bearing on the problem; namely, (1) changes in the age structure of the population, (2) a wider choice of food products that permits of substitution, (3) a development of facilities for marketing perishable farm products great distances from the production areas, and (4) changes in the mode of life, i.e., type of family dwelling, and the substitution of machine power for hand labor resulting in an appreciable decline in physical labor.

Available data indicate that the per capita consumption of potatoes declined from 196 pounds in 1909 to 140 pounds in 1939.† More indicative of the trend of consumption, however, are the averages by decades from 1909 to 1939. These follow:

Decade	Average per capita consumption (pounds)
1910-1919 .....	175.5
1920-1929 .....	156.4
1930-1939 .....	145.0
1910-1939 average .....	158.96

There are recognizable limitations of the statistical data on consumption for the period under discussion, but the importance of the trend of consumption based upon such data appears significant and in line with authoritative opinion on the subject.

While there has been an appreciable drop in the per capita consumption of potatoes, the present rate of consumption of this product does not fall materially below the dietary standards worked out by the United States Bureau of Home Economics, especially in the diet of the family that has an adequate income to spend for food. The four diets‡ prepared by the Bureau of Home Economics follows:

\* Consumption of Agricultural Products. U. S. Department of Agriculture, Bureau of Agricultural Economics. March 1941, p. 2.

† Ibid., p. 12.

‡ U. S. Department of Agriculture Circular 296.

Table 4. FOUR DIETS: APPROXIMATE YEARLY QUANTITIES OF VARIOUS FOODS OR GROUPS OF FOODS NEEDED PER CAPITA FOR THE POPULATION OF THE UNITED STATES

Item	Restricted diet for emergency use	Adequate diet at minimum cost	Adequate diet at moderate cost	Liberal diet
Flour, cereals—Pounds	240	224	160	100
Milk or its equivalent—Quarts	155	260	305	305
Potatoes, sweet potatoes—Pounds	165	165	165	155
Dried beans, peas, nuts—Pounds	30	30	20	7
Tomatoes, citrus fruits—Pounds	50	50	90	110
Leafy, green, yellow vegetables—Pounds	40	80	100	135
Dried fruits—Pounds	10	20	25	20
Other vegetables, fruits—Pounds	40	85	210	325
Fats (including butter, oils, bacon, salt pork)—Pounds	45	49	52	52
Sugars—Pounds	50	35	60	60
Lean meat, poultry, fish—Pounds	30	60	100	165
Eggs—Dozen	8	15	15	30
Estimated 1929 cost per family of five	\$350	\$500	\$800	\$950

Potatoes provide an energy producing food of low unit cost. Recognition was given to the particular food value of potatoes in the diet of persons of different age levels and different occupational activities in the low cost diet recommendations of the Bureau of Home Economics. According to the Bureau the weekly potato or sweet potato requirements for individuals falling within specific classifications are given in Table 5.\*

Table 5. WEEKLY POTATO OR SWEET POTATO REQUIREMENTS OF INDIVIDUALS IN SPECIFIED AGE GROUPS AND TYPES OF WORK

Description	Quantity of potatoes and/or sweet potatoes	
	Pounds	Ounces
Children under 2 years	1	8
Children 2 to 3 years	1	12
Boys: 4 to 6 years	2	0
7 to 8 years	2	4
9 to 10 years	2	8
11 to 12 years	2	12
13 to 15 years	3	0
16 to 19 years	4	4
Girls: 4 to 7 years	2	0
8 to 10 years	2	4
11 to 13 years	2	8
14 to 19 years	2	12
Men 20 years and over:		
Active work	5	12
Moderate work	3	0
Inactive	2	12
Women 20 years and over:		
Active work	3	0
Moderate work	2	12
Inactive	2	0

\* For complete diet recommendations see Food and National Defense issue of Consumers' Guide. Vol. VI, No. 20, September 1940. U. S. Department of Agriculture.

## CONSIDERATIONS RELATING TO THE MARKET FOR OREGON LATE POTATOES

**The California market.** Northern California has become the principal outlet for Oregon late potatoes. Available data indicate that California requires approximately 85 per cent of the Klamath Basin production in addition to the potatoes imported from the other late-potato producing states of Colorado, Idaho, Nevada, and Washington. Some late potatoes are produced in California, in addition to those of Modoc and Siskiyou Counties, and there is a considerable overlapping of California's early potato harvest with the potato production in the several late-producing states. Approximately two-thirds of the Oregon potatoes shipped into the California market are consumed in the northern half of the state that includes the cities of Berkeley, Oakland, Sacramento, San Francisco, San Jose, and Stockton. Southern California markets receive the remaining one-third of the Oregon shipments to California.

The fourteen California counties that comprise the principal market for Oregon potatoes lie within a radius of 100 miles of San Francisco. None of the counties is in excess of 400 miles from the Klamath Basin, the main source of supply for late potatoes. The counties under discussion had a population of 2,184,180 according to the 1940 Census, which indicates a population increase of approximately 13 per cent since 1930.

Over 1,600,000 people live in the San Francisco metropolitan area. These people are engaged mainly in nonagricultural activities; they may be classified, therefore, as users but not producers of agricultural commodities. The intensity and volume of economic activity in northern California have changed completely since 1939. Several billions of dollars worth of government contracts for defense materials and armaments have been placed in the San Francisco Bay area. This condition has resulted in a further quickening of the pace of manufacturing activities and a rapid influx of craftsmen seeking employment in the defense industries. The economic effect on the community has been great with resultant changes in the market and marketing conditions that were not anticipated. There is at present no statistical basis for any statements with respect to the trend of demand for Oregon potatoes. It can be assumed with a reasonable degree of safety that there are a number of economic and social factors that should bring about some increase in the total demand for potatoes, though the per capita demand might not be changed perceptibly. Population changes and physical activity resulting from the types of work engaged in by the consumers are among the more important factors having a bearing on the consumption of potatoes.

**The Oregon market.** The Willamette Valley and the Oregon coast counties comprise the principal outlets for central Oregon potatoes. The Klamath County producing area shipped considerable quantities of potatoes into the markets of western Oregon during the 1940-41 season. The Klamath shipments were made despite a freight change that averages approximately \$18.00 a carload in excess of the freight costs from Redmond, Oregon, the shipping center for the potatoes grown in the central Oregon district. A thorough check of the wholesale dealers in the Portland metropolitan area disclosed that approximately 85 per cent of the total supply of late potatoes is normally obtained from the central Oregon area. The remaining supply originates either locally, in Klamath County, in Idaho, or in Washington. The smaller communities in western Oregon depend on the central Oregon and Klamath districts to supplement the local supply of potatoes.



According to the 1940 Census there were 876,901 persons living in the 18 counties of western Oregon. It is estimated that these counties produce approximately 40 per cent of the potatoes consumed annually in the area. Central Oregon, the Klamath Basin, California, Idaho, and Washington supply the additional requirements above the western Oregon production. The wholesale tradesmen indicate that the annual supply of potatoes for the western Oregon markets is obtained from the following areas:

<i>Producing area or state</i>	<i>Month</i>
Central Oregon, Klamath, or local .....	October-May
California .....	May-July
Washington .....	July-October

## AN ANALYSIS OF THE RETAIL STORE TRADE IN LATE-CROP OREGON POTATOES

**Purpose of retail store survey.** This survey of the retailing of late-crop Oregon potatoes was undertaken for the following reasons:

1. To determine the characteristics of demand for potatoes in those markets served primarily by Oregon producers.
2. To determine by means of sampling the quality and grade of potatoes purchased by consumers in terms of grade, size, variety, and other physical characteristics that have a bearing on the nature of consumer demand.
3. To analyze consumer buying habits with respect to the unit of purchase or the amount of potatoes purchased by the consumer at any one time.
4. To assist producers in marketing their products at the best market price by discovering the nature of consumer preference thereby enabling the producers to cater to the type of market that is open to them.
5. To determine by means of sampling, the extent to which the potatoes sold to consumers or offered for sale to consumers are equivalent to the grade under which they are designated by the merchant or by the grade printed on the package.
6. To determine the type of defects and the cause of the defects found in potatoes being offered for sale in retail stores.

**Method of study.** This report is based on information obtained through a field survey of 174 retail stores handling potatoes. Sixty-seven of the stores were located in the San Francisco Bay area, 65 in Portland, 25 stores in Eugene, and 17 stores in Salem. A representative sample of each grade of Oregon potatoes handled by each store was graded by an inspector from the Oregon State Department of Agriculture.

## THE SAN FRANCISCO BAY AREA POTATO MARKET

Approximately 84 per cent of the Bay area retail stores that sell potatoes purchase through jobbers; 16 per cent of the stores buy directly from the producer. The latter group of stores is composed almost entirely of retail food chains that operate their own potato buying organizations in the producing areas.

It is significant that the managers or buyers of the retail establishments did not consider the designated grade of the potato as indicative of actual quality of the product purchased. Only 21 per cent of the buyers were willing to buy

potatoes from the wholesale or jobbing houses on the basis of grade alone, although 98 per cent indicated that they used the designated grade as one of the bases of selecting potatoes. The retailers, as a general rule, were not familiar with quality; they relied to a considerable degree, therefore, on the jobber to supply them with the quality of potatoes acceptable to their customers. Private brands of producers, shippers, or wholesale concerns appeared to be of little if any significance to the retail dealers, but there was a definite interest shown in the designation of the locality in which the potatoes were produced.

At least 70 per cent of the potatoes purchased by retail stores were U. S. No. 1 grade; approximately 27 per cent were U. S. No. 2 grade; and the remaining 3 per cent were "combination" or "commercial" grade.

The retailers used bins as the most common type of display of the product, the survey showing that approximately 90 per cent of the dealers adopted this form of merchandising. Thirty per cent of the stores displayed their products in sacks (repacked and original containers) in addition to their bin display, but less than 2 per cent displayed sacks exclusively. Forty-two per cent of the stores bought advertising space for potatoes in newspapers. None followed any consistent advertising program. Retailers expressed no definite preference for given types of containers. This can be attributed, no doubt, to the fact that only a small percentage of potatoes is sold in original containers.

Price competition on potatoes appeared to be less of a factor in the California markets than in Oregon. Seventy-five per cent of the retail dealers claimed that they attempted to maintain a definite mark-up above cost price, while 25 per cent admittedly sold at competitive prices. It appears that the dealers in the Bay markets attempt to sell to the consumer a given unit of potatoes in terms of dollars and cents, varying the quantity of potatoes to make possible the maintenance of a money unit sale; that is, 25 cents worth of potatoes may be 8 pounds at one time. If the price is lowered the consumer may receive 10 pounds, the money unit being kept at 25 cents or some other uniform figure.

Consumers of potatoes in the Bay area market were not concerned particularly with the variety of potatoes that were offered to them in the retail stores. Only 34 per cent of the retail store operators had received orders for specific varieties of potatoes, and these requests were for Netted Gems. It is more than possible that the consumer indirectly expressed preference for a given variety by demanding Klamath or Idaho potatoes, the greater part of which are Netted Gems. Although the San Francisco Bay area market consumes more Klamath than any other late-crop potatoes, less than one-half of the store operators that indicated a consumer preference for potatoes grown in a particular area designated Klamath potatoes as being most in demand. It is probable that consumers were reacting unfavorably to quality defects that arose in the potatoes produced in the peat soil sections of the Klamath Basin that were placed in the market during the 1940-41 season.

Retail operators were catering to an established consumer preference for a well-shaped, uniform, bright-colored, 6 to 10 ounce potato that could be satisfactorily boiled or baked. Consumers complained most of the cooking quality of the potatoes. A total of 45 per cent of the dealers reported some consumer objections to the manner in which potatoes reacted to the normal cooking processes, the principal objections being that the potatoes fall apart in cooking or that they turn a dark color. Thirty-one per cent of the dealers reported consumer complaints on interior defects in the potatoes, and 25 per cent stated that their customers objected to the lack of uniformity of size in the product,

especially when the potatoes were to be used for baking purposes. To meet this latter objection retailers indicated that they would be willing to pay a premium of 40 to 60 cents a hundredweight in order to obtain potatoes graded to a 6- to 10-ounce size. It appears that retailers most nearly met their customers' wants by purchasing an average of 70 per cent U. S. No. 1 potatoes, the remaining 30 per cent being of a lower grade.

It is estimated that at least 50 per cent of the potatoes purchased by the Bay area consumers were sold from display bins and display tables. This appears to be indicative of the relative proportion of the consumers in the area that go to the stores to shop for their food products. An additional 10 per cent, by weight, was sold to consumers in packages put up in the retail stores, and 40 per cent, by weight, was sold in original containers. Consumers did not appear to pay any attention to private brands.

In terms of weight, the average unit sale of potatoes to a customer was less than that found in the Oregon markets. Retailers estimated that 55 per cent of the potatoes were sold in lots of 10 pounds or less; 4 per cent in lots of 11 to 15 pounds; 12 per cent in 25-pound bags that were packed at the shipping point; and 29 per cent in 100-pound sacks packed at the shipping point, the 100-pound sacks being sold primarily to restaurants. Consumers indicated no preference as to the type of container (burlap, cotton, or paper), although it may be assumed that they were satisfied with the paper bags used by retailers to package potatoes for consumers in the retail stores. It must be recognized that self-service retail stores are of major importance in the Bay district and the paper bag provides the customary and convenient method for consumers to package their own potatoes if they wish to do so.

The jobbing dealers in the area do considerable repackaging of potatoes. The 100-pound sacks purchased from wholesale firms are repacked in 15- or 25-pound cotton or burlap containers. The repacking operations are carried on without much in the way of state inspection as to grade or quality. As a result certain abuses of quality standards have grown up that are harmful to the potato industry.

## THE PORTLAND POTATO MARKET

The nearness of Portland to surplus late-crop potato producing areas that place considerable quantities of potatoes on the market in the city has a definite bearing on the channels through which the product passes from the producer to the consumer, as well as quality and methods of merchandising. The State Department of Agriculture grading and inspection service is in a favorable position to keep very close check on the quality of potatoes received in the Portland market from out-of-state and the central Oregon and Klamath Basin producing areas. On the other hand, the practical difficulties encountered in inspecting local potatoes produced by many small scale growers are so great that it is almost impossible under existing conditions to afford to the consumer adequate quality protection from the grower and dealer who desire to violate the law.

There are many small scale local operators who try to eliminate the cost of grading to U. S. No. 1 or U. S. No. 2 grades by packing a combination grade product that is superior to a U. S. No. 2 pack but not equal to a U. S. No. 1. Under Oregon law these combination pack potatoes must be marketed as U. S. No. 2, although the lot may contain from 30 to 60 per cent U. S. No. 1 grade potatoes. Local growers who attempt to reduce their costs of marketing by increasing the quality of their pack above the known requirements for the

U. S. No. 2 grade are competing with central Oregon and Klamath Basin growers on the basis of quality within the U. S. No. 2 grade. This type of quality competition is an important factor in the Portland market.

It is estimated that approximately 23 per cent of the retail dealers in late-crop potatoes were purchasing locally grown stocks directly from producers to be sold in competition with potatoes purchased through wholesale channels. Approximately 30 per cent of the retail stores in Portland that sell potatoes purchased them through wholesalers and jobbers. This is a direct contrast to the Bay market where retail stores, exclusive of chain stores, deal only through jobbers, and where 84 per cent of all retailers purchase in that manner. Thirty-one per cent buy from producers or hucksters, and approximately 39 per cent of the stores sampled receive their supply through chain store warehouses that purchase a large share of their potatoes directly from growers in the central Oregon and Klamath County areas.

Thirty-seven per cent of the store operators ordered potatoes on the basis of grade only, this being hardly indicative of the true condition because approximately three-fourths of the above group were chain stores that depended on chain buyers to obtain the desired quality. It appears, therefore, that only about 9 per cent of the retail operators are buying on the basis of grade exclusively. Brands of shippers or wholesalers were of little significance to retail dealers.

The distribution of retail sales between U. S. No. 1 and U. S. No. 2 potatoes was approximately the same as that found in the California markets surveyed; namely, 70 per cent and 30 per cent respectively. Retailers estimate that 50 per cent of the potatoes are sold to the consumers in the original package, 37 per cent are repacked in the retail store, and 13 per cent are sold from display bins or tables.

Seventy-four per cent of the retail stores used the open bin display as a method of merchandising potatoes, although only 9 per cent of the dealers used this method exclusively. Eleven per cent of the dealers displayed the packaged product only. Sales promotion work through newspapers and handbills was much more pronounced in Portland than in the California markets. Seventy-two per cent of the Portland retailers were doing some advertising as compared to 42 per cent in the Bay area. The survey showed that 28 per cent of the dealers were using both newspapers and handbills, 29 per cent used handbills only, and 15 per cent used newspapers only. The sales promotion activities in this market were considered to be the result of the amount of competition among the retail stores on this one product.

Many Portland retailers expressed a distinct preference for certain types of containers. Paper bags were the choice of 30 per cent of the operators. Protection against light, cleanliness, and display value were given as reasons for the selection. Cloth bags were favored by 20 per cent of the merchants, mainly on the basis of their display value. Thirty-seven per cent expressed no preference, while the remaining 13 per cent were divided on burlap bags and boxes.

Price competition was an important factor in the Portland potato market. Several of the stores contacted in the course of the survey used potatoes as a "loss leader," often selling the product below the out-of-pocket cost as well as failing to apportion the proper share of operating costs to handling this item of produce. Producer competition for the market was of such proportion that there was no uniformity in the price at which retail stores purchased potatoes. Truckers operating from Portland to the potato producing areas often return to the city with loads of potatoes that are sold below the market, thereby

affecting the price structure in the entire community. Itinerant truckers are of considerable influence in the market. The members of this group function primarily as wholesale hucksters who purchase potatoes from growers or shippers in the producing area and market the product wherever possible. Since these truckers have no storage facilities, it is incumbent on most of them to dispose of their cargoes within a short time. This pressure to sell within a short period of time naturally has a bearing on the price at which the product can be moved into retail stores.

Portland consumers appear to buy potatoes on the basis of the production locality rather than the basis of variety. There was some evidence that many of the consumers were acquainted with Netted Gems and Burbanks. This demand ordinarily took the form of a request for Deschutes potatoes, which were favored by 55.3 per cent of the Portland trade, or for Klamath potatoes, which were the choice of 15 per cent, or locally grown Burbanks that were favored by 4.6 per cent, or for Idaho potatoes that were the first choice of 1.5 per cent. No preference for potatoes grown in a specific locality was indicated by the remaining consumers. Inasmuch as the larger part of the potatoes received in the Portland market from central Oregon, Klamath County, and Idaho are Netted Gems, one might assume that variety was an important factor in choice. There was no record of consumer preference for a branded product. Retailers reported that many of their customers were objecting to the cooking quality of the potatoes purchased.

Eighty per cent of the retailers stated that their customers had expressed no preference for any special type of container. The remaining 20 per cent of the merchants indicated that their customers preferred paper bags or the paper shopping bags that are used to package potatoes in the retail stores.

The size of the unit of purchase by consumers appeared to average higher in Portland than San Francisco. For example, only 27 per cent of the sales were in lots of 10 pounds or less, which is approximately one-half of the sales of similar weight in the Bay area. Twenty-one per cent of the sales were for units ranging in weight from 11 to 15 pounds; 12 per cent in 25-pound lots; 30 per cent in 50-pound lots; and 10 per cent in 100-pound lots, the latter percentage being lower than the 29 per cent found in the Bay area.

## EUGENE AND SALEM POTATO MARKETS

Eugene (population 20,838) and Salem (population 30,908) are communities located near the heart of the Willamette Valley. They lie within 130 miles of the central Oregon potato producing area and within 280 miles of the Klamath Basin. These short distances make possible the transportation of potatoes by truck from the producing areas at a freight charge that is not great compared to that of hauling to larger market outlets. In addition to the potatoes brought from outside producing areas, a substantial quantity of locally grown potatoes is usually placed on the market in these cities.

The conditions of supply of potatoes for all Willamette Valley communities determine, to a considerable extent, the trade structure in the organized markets of Eugene and Salem. Farmers sell or trade to their retail merchants locally grown potatoes. These potatoes vary greatly in quality and the grading for a given standard of quality is considerably neglected. It becomes difficult, therefore, for producing areas that are selling potatoes on the basis of grade to compete on a price basis with the lower standard product unless the buyers are aware of quality differences. Inasmuch as there are few consumers who are

fully informed as to price and quality differences, there is a tendency for outside producers to ship their lower quality product into the market in order to meet the price competition from the locally grown potatoes. The proximity of the major producing areas of central Oregon and the Klamath Basin to the Willamette Valley communities makes possible the development of direct marketing as well as sales through hucksters operating out of the producing areas.

Only 8 per cent of the Eugene stores and 30 per cent of the Salem stores purchase their supplies of potatoes entirely through established wholesale or jobbing houses. Supplies of potatoes were obtained through chain store warehouses by 8 per cent of the Eugene firms and 6 per cent of the Salem firms. It is significant that stores purchasing from wholesale concerns or through chain store warehouses obtained their products out of Portland, which results in a back-haul of 125 miles to Eugene or 55 miles to Salem.

Approximately 84 per cent of the Eugene merchants and 64 per cent of the Salem merchants received part or all of their supply of potatoes from regular or itinerant truckers operating out of the producing areas. As a result of the method of purchase the merchants were generally forced to make a personal inspection of the potatoes before purchase. Only 12 per cent of the Eugene retailers and 6 per cent of the Salem retailers were willing to buy on the basis of grade or on the reputation of the seller. Private brands were of little significance to retail store operators, only 4 per cent and 6 per cent respectively of the merchants in the two communities considered the brand as a factor in purchase.

The Eugene and Salem consumers are supplied mainly with U. S. No. 2 potatoes. Approximately 70 per cent of the potatoes sold in these markets are U. S. No. 2.\* This seems to imply that there is a desire to obtain a maximum amount of food at a minimum cost, which is possible provided the lower grade for the potatoes is a result of size or shape.

Retail store displays in the original, 25-, 50-, and 100-pound containers were the general rule in the two communities. Bin displays were used also by most merchants. Keen competition resulted in approximately 60 per cent of the retailers using advertising as a means of stimulating demand. The use of potatoes as a "loss leader" was the rule rather than the exception in several of the stores in the areas under consideration. It appeared, however, that price competition of a severe character was confined almost entirely to the U. S. No. 2 grade.

Consumer recognition of and demand for specific varieties of potatoes were more pronounced in Eugene and Salem than in the other cities surveyed. The proximity of the communities to a wholly rural area and the fact that many of the inhabitants have a rural background are believed to be important factors causing the demand for given varieties. There was a consumer preference of two to one for Netted Gems over any other variety. Klamath Basin potatoes were tending to replace central Oregon stocks in both cities. This transfer of preference from one area to another appeared to be related to defects in cooking quality that occurred in the central Oregon product for 1 or 2 years since 1937. Private brands were of considerably more significance to consumers in the Eugene and Salem markets than in either of the larger cities surveyed. Seventeen per cent of the stores in Salem and 8 per cent of the Eugene stores had customers who asked for specific brands.

\* Field-run potatoes with the cull potatoes removed are designated as No. 2 grade under Oregon law. A high percentage of the potatoes grown in the Willamette Valley communities are sold locally under the No. 2 grade.

Retailers were receiving numerous complaints on the cooking quality of the potatoes sold. It was a cause for complaint in 56 per cent of the Eugene stores and 94 per cent of the Salem stores. Interior defects were the basis of consumer complaints in 52 per cent of the Eugene stores and 70 per cent of the Salem stores. Lack of uniformity in size was causing retailers considerable worry during the 1940-41 season.

Competition between local and the U. S. No. 2 potatoes brought into Eugene and Salem markets resulted in an exceptionally low price structure on the products. The low unit retail prices quoted to the consumer on U. S. No. 2 grade tended to induce the consumers to purchase potatoes in sizable quantities. Approximately 80 per cent of all potatoes sold to consumers in the two markets were sold in original containers, of which 70 per cent were 50-pound sacks and 3 per cent 100-pound sacks. Sales of units of less than 10 pounds were estimated by Eugene and Salem retailers at 11 and 17 per cent respectively.

### POTATO SALES TO GOVERNMENT AGENCIES

It is the policy of governmental agencies to purchase their supply of potatoes of a given grade designation from the lowest bidder. This practice of awarding contracts on the basis of the lowest bid has met with particular objection from potato growers and shippers who are supplying the increased requirements of the army and navy camps located in California.

All bidding for government contracts is made on the basis of a price per hundredweight for a given quantity of U. S. No. 1 potatoes delivered to the cantonment. The contracts are awarded for a period of 1 month, new bids being called for each month. The bidders must take into consideration: (1) the price at which the potatoes might be purchased from the growers; (2) sorting, grading, packaging, and transporting; and (3) repackaging charges occasioned by the particular requirements of the military or naval establishment with respect to the type of container. Bidders fulfill the terms of their contracts with the service branches by delivering potatoes that meet the minimum specifications for U. S. No. 1 potatoes. The contract holder attempts to buy from the growers at a price that will enable him to make a profit, because there is little opportunity to reduce any of the fixed charges necessary to grade, package, and transport the product to the place of delivery.

As a result of the quantities called for and the packaging and prestoring requirements in several contracts issued by the government, bidding is restricted necessarily to those agencies that have access to large supplies of potatoes and to the facilities necessary for prestoring and repacking. From the evidence available it would appear that bidding on large military and naval contracts has been restricted to the large carlot wholesale firms and brokers in the California markets.

Contractors have usually fulfilled their government contracts to deliver U. S. No. 1 potatoes by purchasing from the growers producing on the peat soil of the Tule Lake area in the Klamath Basin. Market quotations on the Tule Lake potatoes are ordinarily 10 to 15 cents per hundredweight below the price on the sandy loam products. Inasmuch as the government buyers do not distinguish between potatoes grown under varying soil conditions as long as the products pass the U. S. No. 1 grade specification, the contractors' bids are based on the theory that the supply needed to fulfil their contracts can be obtained from lowland growers. This practice tends to exclude Oregon growers from participating in the government business.

The navy requires that potatoes for use at sea be delivered in a regulation type wood container holding 100 pounds. The contract holder ordinarily ships the potatoes to the seaport terminal in used burlap bags. The potatoes for the navy are repacked in wood boxes at the terminal port in California. There appears to be some saving accruing to the contractor from the use of used bags instead of wood boxes for shipping potatoes to the seaport. The savings on bags and freight are offset somewhat by the expense of repacking at the terminal. Oregon administrative regulations prevent Oregon growers from shipping their potatoes in used bags.\* This is a distinct handicap in obtaining government contracts.

## QUALITY DETERIORATION AFTER SHIPPING POINT INSPECTION

Reasons for deterioration in quality. The investigators found that 65.1 per cent of the samples taken in the San Francisco Bay markets were off-



Figure 2. Potatoes are dug by machine. If damaged in the digging process they go into a lower grade or are discarded entirely.

grade. In the Portland, Salem, and Eugene markets the offgrade samples were 47.6, 36.8, and 22.2 per cent respectively. It is significant that the percentage of samples offgrade averaged much higher in the California markets than in Oregon.

\* Oregon standards for potatoes (1939) state that the potatoes "shall be packed in new or clean No. 1 used bags."



An attempt was made to classify defects found in the samples, thereby determining whether the variations from grade resulted from defects that developed prior to or after shipping the potatoes from the production area. Defects that were considered present at the time of shipping point inspection included sunburn, flea beetle, wireworm, mis-shape, growth cracks, undersize, mechanical injury, jelly end, ring rot, and net necrosis. Defects that occurred after shipping point inspection included light greening, soft rot, dry rot, and broken and shattered potatoes.

Based on the foregoing method of classifying defects, there is adequate reason to believe that all of the samples averaged within grade at the time of shipment from the production area. Of the potatoes sampled in the San Francisco, Portland, Salem, and Eugene markets, the investigators found an average of 11.42, 9.79, 10.04, and 1.17 per cent respectively had defects that developed after shipping point inspection. The sampling showed also that an average of 1.78, 1.54, 1.68, and 3.55 per cent respectively had defects that were present at the time of shipping point inspection. The high percentage of defects in the Eugene samples that was present at the time of shipping point inspection is believed to be due to the fact that more local potatoes are used in the Eugene market. These local potatoes were not inspected as rigidly as the potatoes shipped in from central Oregon and Klamath.

**Shipping point inspection seems adequate.** The grading and government inspecting of potatoes at the shipping point appear to provide the wholesale potato dealers with a satisfactory quality gage for potatoes purchased at the shipping point and/or the wholesaler's place of business. Shipping point inspection does not appear, however, to afford to the consumer the same protection of quality that is given to the wholesale buyers.

The retail store survey records taken in the course of this study show a high percentage of the potatoes offered for sale to the consumer in retail stores are offgrade (Tables 6 and 7), that is, the contents of the package sold to the consumer do not meet the requirements of the grade designated on the container. Several types of defects were found in the samples graded by the investigator, but those that caused the potatoes to fall below their specified grade were mainly attributable to damage or deterioration that occurred after shipping point inspection.

Rough handling, exposure to light in displays, high storage temperature, and improper ventilation contributed heavily to the defects found in the samples. Observations made by the investigators led to the belief that considerable damage was caused by careless handling at the time the potatoes were unloaded by truckers at the retail stores. Other potatoes were shattered or broken by retail employees in moving in the store. More broken potatoes were found in burlap containers than in cotton or paper, but the burlap bags were used for the 50- and 100-pound lots of potatoes. The cotton and paper bags were used for the 10-, 15-, and 25-pound lots. The weight of the unit appears to be the important factor causing damage of this type.

Light greening occurred in 23.3 per cent of the Oregon U. S. No. 1 and 27.2 per cent of the Oregon U. S. No. 2 potatoes sampled in the California markets. This defect was found in 21.6 per cent of the U. S. No. 1 and 14.6 per cent of the U. S. No. 2 potatoes in Portland. The Salem survey disclosed light greening in 18.8 per cent of the U. S. No. 1 and U. S. No. 2 potatoes. The comparable figures for Eugene were 20.0 and 21.3 per cent respectively. The percentage that U. S. No. 1 potato sales were of the total potato sales in

each of the markets was San Francisco Bay area 70, Portland 70, Salem 32, and Eugene 28.

Table 6. PERCENTAGE OF SAMPLES OF OREGON POTATOES SHOWING DEFECTS DEVELOPED AFTER SHIPPING POINT INSPECTION

Type of container	Broken	Light greening	Dry rot	Soft rot
	<i>Per cent</i>	<i>Per cent</i>	<i>Per cent</i>	<i>Per cent</i>
<i>San Francisco Bay Area</i>				
Burlap .....	51.6	16.1	38.7	19.4
Cotton .....	40.9	27.3	63.6	22.7
Paper .....	0.0	0.0	33.3	66.7
<i>Portland, Oregon</i>				
Burlap .....	61.5	12.8	46.2	33.3
Cotton .....	47.1	52.9	17.6	17.6
Paper .....	26.3	0.0	31.6	31.6
<i>Salem, Oregon</i>				
Burlap .....	33.3	20.0	53.3	33.3
Cotton .....	16.7	16.7	33.3	0.0
Paper .....	0.0	0.0	50.0	0.0
<i>Eugene, Oregon</i>				
Burlap .....	30.0	15.0	30.0	40.0
Cotton .....	0.0	0.0	0.0	0.0
Paper .....	0.0	0.0	50.0	0.0

Table 7. PERCENTAGE OF SAMPLES OF OREGON POTATOES FOUND TO BE OFFGRADE BECAUSE OF SPECIFIC DEFECTS DEVELOPED AFTER SHIPPING POINT INSPECTION

Type of container	Broken	Light greening	Dry rot	Soft rot
	<i>Per cent</i>	<i>Per cent</i>	<i>Per cent</i>	<i>Per cent</i>
<i>San Francisco Bay Area</i>				
Burlap .....	16.12	16.12	16.12	19.4
Cotton .....	4.5	27.3	22.7	13.6
Paper .....	0.0	0.0	33.3	66.7
<i>Portland, Oregon</i>				
Burlap .....	23.1	10.2	15.4	61.5
Cotton .....	5.9	41.2	5.9	66.7
Paper .....	0.0	0.0	5.3	100.0
<i>Salem, Oregon</i>				
Burlap .....	6.7	13.3	33.3	100.0
Cotton .....	0.0	16.7	0.0	0.0
Paper .....	0.0	0.0	0.0	0.0
<i>Eugene, Oregon</i>				
Burlap .....	0.0	10.0	5.0	30.0
Cotton .....	0.0	0.0	0.0	0.0
Paper .....	0.0	0.0	0.0	0.0

A considerable part of the deterioration in quality due to broken and shattered potatoes and those affected with light greening was caused by improper handling and displaying. Dry rot and soft rot (Tables 6 and 7), which were found in varying amounts in the samples, may or may not have been caused by merchandising practices.

Relationship between percentage of defects and the type of container. In Oregon retail stores U. S. No. 1 potatoes were found packed in burlap, cotton, and paper containers. Oregon U. S. No. 2 potatoes were found

packed almost entirely in burlap bags. An analysis of the survey records for Portland retail stores shows that fewer defects were present in potatoes packed in paper bags than in burlap or cotton. The frequency of occurrence of paper bags in the San Francisco Bay markets and in Salem and Eugene was not sufficient to warrant a definite statement with respect to tendency, but it appears that potatoes in this type of container showed less of a tendency to light greening and fewer broken than in burlap or cotton. No light greening was found in the samples taken from paper bags. The total average number of defects found in this type of container was only 4.9 per cent in Oregon stores, and 17.4 per cent in California stores. A summary of the defects is given in Tables 8 and 9.

Table 8. PERCENTAGE OF SAMPLES OF U. S. No. 1 POTATOES SHOWING LIGHT GREENING, BY TYPE OF CONTAINER AND BY MARKET AREA

Type of container	Oregon	California
	<i>Per cent</i>	<i>Per cent</i>
Cotton sacks .....	40.0	28.6
Burlap sacks .....	9.1	11.8
Paper sacks .....	0.0	0.0

Table 9. AVERAGE PERCENTAGE OF DEFECTIVE U. S. No. 1 POTATOES IN SAMPLES

Type of container	Oregon	California
	<i>Per cent</i>	<i>Per cent</i>
<i>Cotton sacks:</i>		
Defects due to light greening .....	14.0	5.2
Defects due to other causes .....	5.0	12.2
Total defective potatoes .....	19.0	17.4
<i>Burlap sacks:</i>		
Defects due to light greening .....	3.3	1.9
Defects due to other causes .....	6.1	6.0
Total defective potatoes .....	9.4	7.9
<i>Paper sacks:</i>		
Defects due to light greening .....	0.0	0.0
Defects due to other causes .....	4.9	17.4
Total defective potatoes .....	4.9	17.4

Potatoes in burlap bags showed much less of a tendency to light greening than those in cotton bags. The average percentage of the defects other than light greening was slightly higher in burlap containers than in paper or cotton. Potatoes appear to be much more susceptible to light greening in cotton bags than either of the other types. Dry rot and soft rot were particularly noticeable in potatoes packed in paper bags. Open mesh bags were not used widely in any of the markets.

**Results of sampling in several classes of stores.** The investigators were unable to find any definite correlation between the volume of potatoes sold by a given store and the percentage of defects found in the samples taken. Neither was there any relationship between the class of store (based on type of appeal to consumer) and the percentage of potatoes offgrade. Type of store

ownership (associated buying chain, chain, or independent) appeared to have no bearing on the maintenance of grades designated on the containers.

### EFFORTS TO MAINTAIN QUALITY

Efforts to regulate the quality of potatoes marketed within the state and in out-of-state markets are carried on cooperatively by the Oregon State Department of Agriculture and the Federal Government. Oregon has adopted the United States Department of Agriculture standards for grading potatoes, except that provisions for combination grades are not included in the Oregon law. The acceptance of the federal standards instead of state standards appears to have arisen from the fact that Oregon late potatoes are marketed in direct competition with late potatoes from other states that are sold under federal grades, and grading at the shipping point on the basis of federal standards provides the most acceptable plan for protecting the quality of the product at the shipping point.

In the course of the survey the investigators observed rather closely the grading and inspection work carried on in the central Oregon and Klamath Basin potato areas. The grading was done in accordance with the regulations under which the potatoes were marketed and particular effort was made by the inspection service to protect the quality of Oregon products sent to out-of-state markets.

**Cooperative inspection service in Klamath Basin.** California has never adopted by law the federal standards for grading potatoes with the result that the potatoes produced and marketed in California will ordinarily meet the minimum requirements of a given California grade unless some special provision is made to do otherwise. A significant factor in the permissive standards of California law is that a product that is 80 per cent edible and not mislabeled can be marketed. No specific grade marking is required. Those potatoes that are graded No. 1 must be equivalent to a U. S. No. 1 graded potato. Grade designations, however, are permissive rather than mandatory. The maximum tolerance for specific types of defects is 20 per cent by weight on the individual potato with an additional tolerance of 5 per cent by weight of the potatoes in any one container or bulk lot, and such potatoes that fail to meet the equivalent of U. S. No. 1 grades are sold ungraded and without any grade marking.

The county agricultural commissioners for Modoc County and for Siskiyou County of California have arranged for grading potatoes shipped from that area on the basis of federal standards and for the inspection service to be done by the same inspectors that operate in Klamath County, Oregon. The cost of operating the federal-state potato inspection service that carries over into the two California counties is borne by regular fees paid by the one for whom the inspection is made.

As a result of the use of federal standards by Modoc and Siskiyou Counties it has been possible to market the entire output of marketable Klamath Basin potatoes under one grading standard. No particular effort has ever been made to distinguish in the market places between Oregon Klamath potatoes and California Klamath potatoes. A survey of the brokerage, wholesale, jobbing, and retail firms in principal potato markets for Oregon grown potatoes disclosed that the tradesmen were not usually aware of the fact that the Klamath Basin potatoes were grown in California as well as Oregon, although they were aware of the differences of external appearance of lots of potatoes received from the Klamath area.

Central Oregon and Klamath Oregon potatoes grown in light sandy soil. The type of soil in which potatoes are grown has a material effect on the physical structure of the tuber as well as the appearance and texture of the skin. In the main, potatoes grown in the central Oregon and Klamath County growing areas are of a "bright" color and are free from dirty particles when harvested. These potatoes are grown in a sandy loam soil. California Klamath potatoes, a substantial part of which are grown in the heavy peat soil of the old Tule Lake basin must ordinarily be washed before they can be graded and shipped into the consuming markets. These potatoes grade out the same on the basis of U. S. Department of Agriculture grading standards. The potatoes grown in the heavy peat soils ordinarily sell at a price somewhat below that obtained for central Oregon and Klamath County potatoes. This lower price is attributed mainly to the color and texture of the skin.

Modoc and Siskiyou Counties permit minimum California standards for grading potatoes during 1940 season. A considerable portion of the potato crop grown in the Tule Lake area during the 1940 season was affected with net necrosis. The extent of the damage caused by this disease was considerable and the immediate economic loss that would have resulted from declaring the product unmarketable was great, because many of the potatoes could not have been sold under U. S. grades. The officials of Modoc and Siskiyou Counties resorted to the use of California permissive standards. These potatoes were sold throughout California. No grade designation appeared on the container, but the shipper's brand and the term "Klamath Potatoes" were always in evidence. Dealers in the California markets felt that the reputation of the Klamath district for a high quality potato was being undermined very rapidly, and they were exceptionally critical of the inspection policy that permitted the potatoes to be shipped from the producing districts. There was considerable question raised as to whether the shippers and growers could afford to permit the reputation for quality to be destroyed as a result of lowering the standard of quality for Klamath potatoes that has been built up in the California market.

## MARKETING METHODS AND MARKETING COSTS

Factors that determine marketing methods. There are several methods or combinations of methods that may be used by growers for marketing potatoes. The grower's choice of a method of marketing is conditioned by such factors as the quantity and quality of potatoes that he has to sell, his financial position at the time of harvest, the relation of the total supply of potatoes to the total demand, available marketing facilities, distance from consuming market, habit, personal like or dislike for the middlemen engaged in marketing the product, and the desire of the producer to obtain a greater share of the consumer's purchasing price.

Marketing central Oregon potatoes. Most of the central Oregon growers sell their potatoes to one or more of the three shippers who operate in Redmond, Oregon. Reliable estimates indicate that approximately 90 per cent of the potatoes marketed by the growers in the area are handled by these shippers, the remaining 10 per cent are sold to itinerant truckers at the farm and to retail dealers in the Willamette Valley communities. A few of the growers who deal directly with the retail store buyers haul their own potatoes to market; others sell to large buying groups, such as chain stores, and depend on

established means of transportation for getting their products to market. Brokers are used by shippers and growers to find satisfactory market outlets for their products.

There are no producers in the central Oregon district growing potatoes on a scale comparable to some of the larger operators in Klamath or Idaho. The quantity of potatoes to be marketed by any one producer is usually too small to permit the establishment and the maintenance of marketing facilities solely for his own use. Sales to chain store buyers are of some consequence in the market, in which case the producers are contacted by buyers operating in the producing area. Brokers are used extensively by two of the shipping firms in Redmond. The largest shipper in the area sells about 10 per cent of his potatoes through brokers, the major part of his business being carried on directly with carlot wholesalers, jobbers, and chain stores.

The shippers in central Oregon are engaged in a general feed and seed business. Two of the three operators do a considerable volume of business in farm machinery and equipment. The reason for the lack of specialization on the part of the shippers is evident when one considers that the total inspected shipments of potatoes from the area averaged 900 carloads for the period 1938-1940 inclusive.

The proximity of the central Oregon producing area to Portland and other Willamette Valley communities and the comparatively favorable freight costs have been the most important factors in making the Valley population the principal consumers for central Oregon potatoes. A few carloads of potatoes are always marketed in California, some in Washington, and occasional shipments are made to islands in the Pacific. Unless there is an exceptionally heavy crop of central Oregon potatoes, no particular effort is made by the growers or shippers to place their potatoes in California or Washington markets where freight costs are unfavorable to the central Oregon area.

The extent to which the central Oregon producers can compete for markets with Klamath Basin, Idaho, and Washington growers on the same quality

Table 10. FREIGHT TARIFFS ON IRISH POTATOES FROM DESIGNATED PRODUCING-SHIPPING STATIONS TO SPECIFIC DESTINATIONS

Destination	Oregon		Idaho		Washing- ton
	Klamath Falls	Redmond	Kimberly	Shelly	Toppenish
Los Angeles .....	46½	55	64	65	66
San Francisco .....	23	27	49	55	52
Seattle .....	33½*	29½	61†	64†	16*
Seattle .....	32½	28½	75§	78§	14½‡
Portland .....	22	17*	56†	59†	18*
Portland .....	22	15½‡	69§	72§	16½‡
Dallas, Texas .....	86	86	86	86	86½
Houston, Texas .....	86	86	86	86	86½
New Orleans, La. ....	92	92	92	92	92½
Kansas City, Mo. ....	75	75	67	67	67½
Chicago, Illinois .....	92	92	87	87	87½
Cincinnati, Ohio .....	105	105	100	100	100½

\* Straight or mixed carloads. Minimum weight October 1-March 31, 36,000 lbs.; April 1-September 30, 30,000 lbs.

† Straight or mixed carloads. Minimum weight October 1-May 31, 36,000 lbs.; June 1-September 30, 30,000 lbs.

‡ Minimum weight 44,000 lbs.

§ Minimum weight 24,000 lbs.

|| Includes sweet potatoes. Minimum weight October 1-April 30, 36,000 lbs.; May 1-September 30, 30,000 lbs.

potatoes is governed to a considerable degree by the transportation charges in getting the potatoes to market. Table 10 shows that the producers in the area have the most favorable transportation cost from Redmond, the shipping station, to Portland. The freight cost disadvantage to the San Francisco market is not great, being only 4 cents a hundredweight above Klamath Falls. The experience of the members of the industry shows that the wholesale prices for potatoes from the producing areas listed in Table 10 will not vary perceptibly; the freight differential, therefore, will have to be absorbed by the grower or by the middlemen handling the potatoes.

**Marketing Klamath Basin potatoes.** The volume of potatoes available for market in the Klamath Basin is sufficient to enable four large San Francisco wholesale concerns and one chain store system to maintain buying stations and shipping facilities in the producing area. Two other wholesalers located in the principal consuming markets maintain resident buyers in the district. During the 1939-40 potato season there were seven shippers other than those mentioned, each of whom shipped between 160 and 650 cars of potatoes out of the Klamath Basin.

The federal-state inspection service issued shipping inspection certificates to an estimated 588 different potato shippers in the Klamath Basin during the 1939-40 season. The extent to which growers were doing a part or all of their

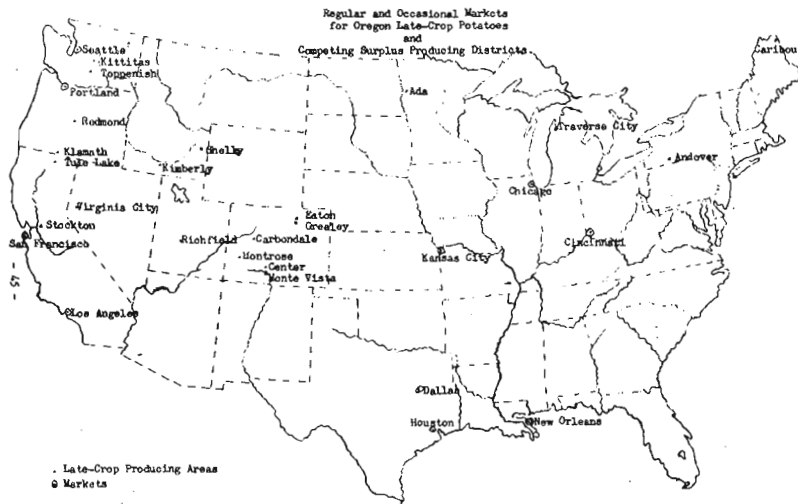


Figure 2.

own marketing is indicated by the fact that 443 of the shippers sent five carloads or less of potatoes out of the area, and of this number certificates were issued to 188 shippers who sent less than one carlot each. Most of these growers engaged in shipping potatoes were selling through brokers to jobbers and to the smaller chain stores in the California markets. In some instances the large carlot wholesale concerns that maintained buying stations in the producing area were acting as brokers for the small shipping firms and for some of the growers.

Based on the record of carlot shipments and on the records obtained from the several individuals and firms engaged in shipping potatoes from the area, it appears that the four San Francisco carlot-wholesale firms and the one chain store organization handle approximately 60 per cent of the total potatoes shipped out of the producing district. In addition to the strictly wholesaling functions of the carlot-wholesalers, they function as selling brokers for other shippers and growers, thereby becoming an important factor in the marketing of additional quantities of Klamath Basin potatoes.

The trade structure in the San Francisco Bay area markets is so organized that carlot-wholesale firms do not sell to retail stores. All sales are made to jobbers who in turn sell to retail stores, or to truckers who sell to retail dealers. In the Sacramento Valley markets, the numerous jobbing concerns buy through these large carlot-wholesalers, or they buy from growers or shippers in the producing area.

Practically all of the firms and individuals engaged in buying and shipping potatoes in the Klamath Basin area are conducting their potato trade as a part of their entire business operations. This is especially true in case of the San Francisco firms that maintain buying stations in the district. Although these buying stations were established primarily for obtaining a supply of potatoes, a desire for efficiency in their buying activities has caused these firms to use their facilities and personnel for the purchase of onions and other root crops such as carrots, beets, and rutabagas. The independent shippers and brokers have, as a general rule, restricted their activities to potatoes and onions. One shipping firm was conducting a general feed and seed business.

The freight tariffs in Table 10 show the relative position that the Klamath Basin potato producers occupy with respect to supplying the several markets with their products. On the basis of fruit costs, northern California is the natural outlet for the Klamath potatoes; the only section that approaches a competitive freight cost is the central Oregon producing area. There is a sufficient differential, however, to keep central Oregon potatoes out of the California markets unless there is an exceptionally heavy surplus in this area over the requirements of the Willamette Valley trade. One must realize that freight advantage is valuable to the producers in the area only as long as the quality of their products and other costs are equal to those of other late potato producing districts. This is especially true in the northern California market where it has been shown that the unit of purchase of potatoes by the consumer is small, and that a difference in freight of 10 to 15 cents per hundred will not appreciably affect the amount of potatoes that the consumer can buy for 25 cents in the retail store. The reason for this is that the price of the potatoes is a component of two costs; namely, the cost of the potatoes to the retailer and the cost of service that is required in repackaging in small containers.

**Basis of sale by growers to shippers.** Most of the potatoes sold to shippers in the central Oregon and the Klamath Basin areas are priced on the basis of the grade, f.o.b. shipping point. Premium prices are paid growers for premium grades, that is, potatoes that are graded to a special size.

Practically all grading is done in the potato cellars. The cost of grading the potatoes is borne by the grower. If the state inspectors degrade the potatoes at the shipping point, the cost of regrading is ordinarily charged to the grower. This practice of charging the grower for regrading is tempered somewhat by the shippers in this district, especially when there is reason to believe that the shipper is partly responsible for the method of grading. Grading crews and equipment are furnished by the shippers in central Oregon, the grower paying



the cost which varies between  $4\frac{1}{2}$  cents and  $13\frac{1}{2}$  cents per hundredweight, the average cost being approximately  $7\frac{1}{2}$  cents per hundredweight. Commercial grading crews operate in the Klamath Basin area, the groups being independent of the shippers. Charges average approximately  $7\frac{1}{2}$  cents per hundredweight on 100-pound sacks, and  $12\frac{1}{2}$  cents per hundredweight when 25-pound sacks are used. The costs of grading and sacking 10- and 15-pound containers are proportionately higher. A few of the growers in both areas have their own grading equipment and do their own grading. Prices quoted to the growers are in terms of 100-pound units of potatoes. Containers are furnished by the buyers. The cost to the grower of hauling his potatoes to the shipping point will approximate 5 cents per hundredweight.

The same practices and charges apply to U. S. No. 1 and U. S. No. 2 potatoes. The results can be illustrated by the assumed figures that follow:

Price paid to grower for U. S. No. 1 potatoes per cwt. ....	\$ .70
Grading cost per cwt. ....	.075
Hauling cost per cwt. ....	.050
	<hr/>
Net return to grower for potatoes per cwt. ....	\$ .575
Price paid to grower for U. S. No. 2 potatoes per cwt. ....	.25
Grading cost per cwt. ....	.075
Hauling cost per cwt. ....	.050
	<hr/>
Net return to grower for potatoes per cwt. ....	\$ .125

The figures given above are indicative of the practices in the central Oregon and Klamath Basin producing areas. Hauling costs from cellars are reduced in the Klamath area because most of the cellars are located on the highway or by railroad lines.

**Buying and assembling functions performed in production area.** Shippers may be divided into three groups; namely, independent shippers, carlot-wholesale buying stations, and chain store buying stations. Buying and assembling potatoes for carlot shipment to the consuming markets are the principal functions performed by the shippers. In every respect the shipper is a merchant. He buys and sells potatoes and performs the necessary services incident to a business of that kind. Regardless of the classification of the shipper (independent, carlot-wholesale, or chain) he maintains an established place of business in the producing area. He ordinarily has temporary storage facilities for a small percentage of potatoes that might be delivered to the shipping station for grading, regrading, or repackaging, and he maintains terminal or loading facilities.

Independent shippers sell directly to wholesalers, to jobbers, to chain stores, or to retail stores. They often use brokers to market their products. Joint-account sales through brokerage houses are quite common. The shippers who have been in business for some time have ordinarily developed a steady trade that can be depended upon as the principal outlet for the shipper in the several consuming markets. It is with these regular customers that the shippers' brands are of most significance as indicators of grade or quality.

The carlot-wholesale firms and the chain stores that maintain buying stations in the Klamath Basin are carrying on their potato business as a part of their general produce operations. These wholesale houses sell to the several produce jobbers and hucksters operating in the Bay area, and in addition they

engage in shipping Oregon potatoes wherever markets can be found. These wholesalers often function as brokers for the independent shippers and the growers.

The chain store buying station is used to obtain a part of the system's supply of late-crop potatoes. Shipments are made out of the producing area to the several supply concentration centers of the chain. From these central warehouses the retail units of the organization obtain their regular supplies.

Resident buyers are the purchasing agents of wholesale concerns or chain stores. They maintain a buying office in the producing area but do not normally maintain any facilities for handling the products. Arrangements for purchase and shipment are made with the grower. In this instance as in each of the foregoing it is difficult to classify the middleman. There is a tendency for their functions to overlap, especially when business is slack and there is an opportunity to perform more of the marketing functions in order to increase their income. For example, shippers may function as brokers; brokers may engage in buying and selling; and wholesale concerns may carry on a commission business.

**Sales by shippers to wholesale dealers.** Theoretically the shippers attempt to price their product to yield to themselves a net return of 5 cents per hundredweight of potatoes. Practically, the market does not permit such exact operations. Title to the potatoes is held by the shipper. To the extent that the shipper buys from the growers after orders are received, the price to the grower can be adjusted to net the desired return. If the shipper buys ahead of his orders for potatoes, he runs the risk of loss through lowering of the market price. On the other hand, he would gain if the market rose. It is the practice of the shippers to buy most of their potatoes as orders are received, especially when there is a surplus on the market. Under a policy of this kind the grower is the risk-taker, both from the standpoint of price changes and deterioration of stock. Financing becomes a real problem to the growers during years of low prices. Written contracts with growers are used only when shippers have contracted ahead for the delivery of potatoes. Otherwise, purchases are made when orders are received. Cash advances to growers are usually part of the contract terms.

**Terms of sale.** It is estimated that 90 per cent of the independent shippers' sales of potatoes are made for cash or on sight draft. The wholesale houses extend credit to their customers in accordance with their usual practices for all produce sales.

**Sales promotion.** The percentage of potatoes shipped under the shippers' brands was higher for those concerns that sold their own potatoes than for the firms that depended on brokers to find a market. Sales made to truckers at the shipping point are invariably sold under the label of the shipper. Such sales are made for cash.

Efforts to promote the sale of Oregon potatoes in California markets have been confined almost entirely to carlot-wholesale concerns and to the chain stores. While these firms have done much to establish and maintain the market for Oregon potatoes, there are natural limitations to depending on the sellers to maintain a market for the producers under all conditions.

The growers and shippers in the central Oregon district have cooperated much more fully than the Klamath Basin growers and shippers in promoting the sale of potatoes produced in the area. The cooperative sales promotion

work in each of the producing areas has lacked consistency and it appears to have been entirely too irregular to gain permanent results. The independent shippers in the central Oregon market have done a good deal to promote their private brands and at the same time create a demand for central Oregon potatoes.

**Factors affecting the price paid to producers.** Oregon grown potatoes must be sold in direct or indirect competition with potatoes grown in other states. The price received is conditioned by the price of potatoes of like quality produced in other areas and the comparative cost of transportation to the consuming markets from each of the producing districts. Within limits the local potato prices may be above or below the other markets, a condition that is usually temporary and due to the failure of the growers and/or shippers to regulate the flow of their products to the market. When excessive quantities of potatoes are shipped to a consuming market depending on selling the product to the highest bidder on arrival, the demand situation may be such that the shipper will be forced to accept a low price to avoid loss through deterioration or through the cost of storage.

The several phases of the price-supply relationships in the potato market have been covered quite adequately in a number of bulletins and articles published by governmental and private agencies. No attempt will be made to repeat this work. The calculations to follow are restricted entirely to the division of the consumer's purchase price of potatoes.

During the period that the growers were being paid 70 cents per hundredweight (net yield 57.5 cents) for U. S. No. 1 potatoes in the producing area, consumers were able to buy potatoes of like quality in the Portland market from 89 cents to \$1.75 per hundredweight in the original container. In the San Francisco market the price per hundredweight during the same period varied between \$1.50 and \$1.75 per hundredweight. Potatoes selling at 89 cents per hundredweight were selling below cost to seller. Because of this fact the consumers bought most of their potatoes from the firms selling at the lower price level. Under ordinary conditions it is believed that the following hypothetical example gives a fair indication of the items that enter into the price the consumer pays for potatoes in the Portland market.

Cost to shipper of 100 pounds of U. S. No. 1 potatoes .....	\$ .70
Shipper's margin .....	.05
Freight charge to Portland from Redmond, Oregon .....	.155
Hauling and unloading cost to warehouse .....	.05
Cost to wholesale dealer or chain store .....	\$ .955
Estimated margin to wholesale dealer .....	.195
Cost to retail store dealer .....	\$1.15
Estimated retail store margin .....	.35
Price to the consumer for 100 lbs. U. S. No. 1 potatoes .....	\$1.50

The foregoing tabulations tell a part of the story only. Most of the consumers buy potatoes in less than 100-pound lots. In fact, 27 per cent of the Portland consumers buy potatoes in lots of 10 pounds or less. In a case of this kind the retailer resacks the potatoes in small paper bags. Normally the retailer will get about 9½ bags weighing 10 pounds each out of each 100-pound sack. He loses about 5 pounds out of each 100 in weighing and from sorting

out defective potatoes. These sacks of 10 pounds each will sell for approximately 25 cents each. If this selling price is correct, the retail dealer will obtain \$2.375 for each 100-pound sack of potatoes he purchases. The consumer in this instance as in many others is paying the retailer for his services that are particularly necessary in cities where the consumer's facilities for storing are small and the demand for food tends to be in small units.

**Transportation facilities.** Ample rail facilities are available to the producers for the shipment of potatoes to the consuming markets. The development of a system of highways out of the Klamath Basin has opened up additional markets in northern California and Oregon that were not easily accessible by rail. The competition between the truck lines and railroad lines has caused a reduction in freight rates to the principal consuming markets in Oregon and California. This has added to the competitive advantage of the Oregon producers in the northern California markets. Under normal supply conditions this decrease in transportation charges should increase the return to the grower.

An average of approximately 20 per cent of the potatoes shipped out of the central Oregon and Klamath districts is hauled by trucks. It appears that the truck shipments are now confined primarily to supplies moved into the small Willamette Valley communities and to the northern California markets as far south as Sacramento. Practically all of the Oregon potatoes shipped into the San Francisco Bay markets are now moved by rail.

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H. E. Coshy .....	Poultry Husbandman in Charge
C. E. Holmes, Ph.D. ....	Associate Poultry Husbandman
W. T. Cooney, B.S. ....	Research Assistant (Poultry Husbandry)

#### *Veterinary Medicine*

J. N. Shaw, B.S., D.V.M. ....	Veterinarian in Charge
E. M. Dickinson, D.V.M., M.S. ....	Veterinarian
O. H. Muth, D.V.M., M.S. ....	Associate Veterinarian
R. W. Dougherty, D.V.M., M.S. ....	Assistant Veterinarian
A. S. Rosenwald, B.S., D.V.M. ....	Assistant Veterinarian
M. P. Chapman, D.V.M. ....	Research Assistant (Veterinary Medicine)
K. S. Jones, D.V.M. ....	Research Assistant (Veterinary Medicine)
W. R. Jones, D.V.M. ....	Junior Veterinarian, Bureau of Animal Industry*

† On leave.

# STATION STAFF—(Continued)

## Division of Plant Industries

G. R. Hyslop, B.S.....Agronomist; In Charge, Division of Plant Industries

### Farm Crops

H. A. Schoth, M.S.....Agronomist; Division of Forage Crops and Diseases\*  
D. D. Hill, Ph.D.....Agronomist  
R. E. Fore, Ph.D.....Associate Agronomist\*  
L. E. Harris, M.S.....Associate Agronomist  
H. H. Rampton, M.S.....Assist. Agronomist (Division of Forage Crops and Diseases)\*  
H. E. Finnell, M.S.....Assistant Agronomist  
Elton Nelson, B.S.....Agent, Division of Cotton and Other Fiber Crops and Diseases\*  
Louisa A. Kanipe, B.S.....Junior Botanist, Division of Seed Investigations\*  
L. R. Hansen, M.S.....Research Assistant (Farm Crops)  
Henry R. Fortmann, B.S.....Research Graduate Assistant (Farm Crops)

### Food Industries

E. H. Wiegand, B.S.A.....Technologist in Charge  
T. Onsdorff, M.S.....Associate Technologist  
E. W. Harvey, Ph.D.....Assistant Technologist  
H. S. Madsen, B.S.....Assistant Technologist

### Horticulture

H. Hartman, M.S.....Horticulturist (Pomology) In Charge  
W. S. Brown, M.S., D.Sc.....Horticulturist  
A. G. B. Bouquet, M.S.....Horticulturist (Vegetable Crops)  
C. E. Schuster, M.S.....Horticulturist (Division of Fruit and Vegetable Crops and Diseases)\*  
W. P. Duruz, Ph.D.....Horticulturist (Plant Propagation)†  
G. F. Waldo, M.S.....Associate Pomologist (Division of Fruit and Vegetable Crops and Diseases)\*  
E. Hansen, M.S.....Assistant Horticulturist (Pomology)  
A. N. Roberts, M.S.....Research Assistant (Horticulture)

### Soil Science

W. L. Powers, Ph.D.....Soil Scientist in Charge  
C. V. Ruzek, M.S.....Soil Scientist (Fertility)  
M. R. Lewis, C.E.....Irrigation and Drainage Engineer, Soil Conservation\*  
R. E. Stephenson, Ph.D.....Soil Scientist  
E. F. Torgerson, B.S.....Associate Soil Scientist (Soil Survey)  
J. M. Haley, B.S.....Assistant Irrigation Engineer, Cooperative Agent, Soil Conservation Service\*  
A. W. Marsh, M.S.....Research Graduate Assistant (Soils)  
H. E. Dregne, M.S.....Research Graduate Assistant (Soils)

### Agricultural Chemistry

J. S. Jones, M.S.A.....Chemist in Charge  
R. H. Robinson, M.S.....Chemist (Insecticides and Fungicides)  
J. R. Haag, Ph.D.....Chemist (Animal Nutrition)  
D. E. Bullis, M.S.....Associate Chemist  
P. H. Weswig, Ph.D.....Assistant Chemist

### Agricultural Engineering

F. E. Price, B.S.....Agricultural Engineer in Charge  
W. M. Hurst, M.A.....Agricultural Engineer, Bureau of Agricultural Chemistry and Engineering\*  
H. R. Sinnard, M.S.....Associate Agricultural Engineer (Farm Structures)  
C. I. Branton, B.S.....Assistant Agricultural Engineer†  
G. R. Stafford.....Engineering Aid, Bureau of Agricultural Chemistry and Engineering\*  
H. F. Carnes, B.S.....Junior Agricultural Engineer, Bureau of Agricultural Chemistry and Engineering\*  
L. M. Klein, B.S.....Mechanical Engineer, Bureau of Agricultural Chemistry and Engineering\*

### Bacteriology

G. V. Copson, M.S.....Bacteriologist in Charge  
J. E. Simmons, M.S.....Associate Bacteriologist  
W. B. Bollen, Ph.D.....Associate Bacteriologist  
Carl Lamanna, Ph.D.....Research Assistant (Bacteriology)

### Entomology

D. C. Mote, Ph.D.....Entomologist in Charge

† On leave of absence.

# STATION STAFF—(Continued)

B. G. Thompson, Ph.D.....Associate Entomologist  
 S. C. Jones, M.S.....Associate Entomologist  
 K. W. Gray, M.S.....Associate Entomologist  
 Joe Schuh, M.S.....Assistant Entomologist  
 H. E. Morrison, M.S.....Assistant in Entomology

## Home Economics

Maud M. Wilson, A.M.....Home Economist

## Plant Pathology

C. E. Owens, Ph.D.....Plant Pathologist in Charge  
 S. M. Zeller, Ph.D.....Plant Pathologist  
 F. P. McWhorter, Ph.D.....Plant Pathologist\*  
 B. F. Dana, M.S.....Plant Pathologist (Division of Fruit and Vegetable Crops and Diseases)\*  
 F. D. Bailey, M.S.....Associate Plant Pathologist (Agricultural Marketing Service)\*  
 P. W. Miller, Ph.D.....Associate Pathologist (Division of Fruit and Vegetable Crops and Diseases)\*  
 G. R. Hoerner, M.S.....Agent (Division of Drug and Related Plants)\*  
 John Milbrath, Ph.D.....Assistant Plant Pathologist

## Publications and News Service

C. D. Byrne, Ed.D.....Director of Information  
 E. T. Reed, B.S., A.B.....Editor of Publications  
 F. L. Ballard, B.S.....Agricultural Editor of Publications  
 D. M. Goode, M.A.....Editor of Publications  
 J. C. Burtner, B.S.....In Charge of News Service

## Branch Stations

L. Childs, A.B.....Superintendent, Hood River Branch Experiment Station, Hood River  
 F. C. Reimer, M.S.....Superintendent, Southern Oregon Branch Experiment Station, Talent  
 D. E. Richards, B.S.....Superintendent, Eastern Oregon Livestock Branch Experiment Station, Union  
 H. K. Dean, B.S.....Superintendent, Umatilla Branch Experiment Station (Division of Western Irrigation Agriculture), Hermiston\*  
 H. B. Howell, B.S.....Superintendent, John Jacob Astor Branch Experiment Station, Astoria  
 G. A. Mitchell, B.S.....Superintendent, Pendleton Branch Station (Dry Land Agriculture), Pendleton\*  
 M. M. Oveson, M.S.....Superintendent, Sherman Branch Experiment Station, Moro\*  
 E. S. Degman, Ph.D.....Superintendent and Associate Pomologist, (Division of Fruit and Vegetable Crops and Diseases), Medford\*  
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 Obil Shattuck, M.S.....Assistant Superintendent, Squaw Butte-Harney Cooperative Range and Livestock Station, Burns  
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