

Marketing Maine Potatoes in Maine and in Boston

GORDON W. SPRAGUE

assisted by

MAYNARD H. HINCKS, GERTRUDE G. FOELSCH

and

HERBERT W. MUMFORD, Jr.

Cooperative Research and Service Division

Farm Credit Administration

United States Department of Agriculture

in cooperation with

The Maine Agricultural Experiment Station

FARM CREDIT ADMINISTRATION

A. G. BLACK, *Governor*

Cooperative Research and Service Division

T. G. STITTS, *Chief*

W. W. PATRICK, *Associate Chief*

Business Administration:

Kelsey B. Gardner
H. C. Hensley
Gordon W. Sprague
Gertrude Foelsch

Cotton:

Omer W. Herrmann
John S. Burgess, Jr.

Dairy:

T. G. Stitts
Wm. C. Welden
D. D. Brubaker
Paul E. Quintus
P. E. O'Donnell
Louis F. Herrmann

Frozen Food Lockers:

S. T. Warrington

Fruits and Vegetables:

A. W. McKay
M. C. Gay
N. Fogelberg
H. W. Mumford, Jr.
J. H. Heckman
Ford A. Quitslund
E. W. Cake
W. Gordon Leith

Grain:

Harold Hedges
Harry E. Ratcliffe
E. B. Ballow

History and Statistics:

R. H. Elsworth
French M. Hyre
Florence C. Bell

Farm Mutual Insurance:

V. N. Valgren
Kenneth H. Hansen

Livestock and Wool:

C. G. Randell
L. B. Mann
H. H. Hulbert
James M. Coon
Thomas E. Neal

Poultry:

John J. Scanlan
Roy W. Lennartson

Purchasing:

Joseph G. Knapp
John H. Lister
Gerald M. Francis

Special Crops:

H. M. Bam

Traffic:

L. N. Conyers

General Assignments:

Clarence Pike

The Cooperative Research and Service Division conducts research studies and service activities relating to problems of management, organization, policies, merchandising, sales, costs, competition, and membership, arising in connection with the cooperative marketing of agricultural products and the cooperative purchase of farm supplies and services; publishes the results of such studies; confers and advises with officials of farmers' cooperative associations; and cooperates with educational agencies, cooperative associations, and others in the dissemination of information relating to cooperative principles and practices.

Copies of this publication may be obtained upon request, while a supply is available, from the

*Director of Information and Extension,
Farm Credit Administration, Washington, D. C.*

Foreword

MAINE potato growers in recent years have been confronted by increasingly difficult marketing problems. In an effort to assist these growers, the Cooperative Research and Service Division of the Farm Credit Administration and the Maine Agricultural Experiment Station jointly undertook a project for the purpose of obtaining information that might be used in developing more effective means of meeting some of the problems of these growers.

Information presented in this bulletin includes some material on the source and the nature of competition which Maine potato growers must meet, on marketing methods and practices in Maine and in the Boston wholesale markets and retail stores, and on consumer preferences in the use of potatoes. An effort has been made to determine whether or not there is an opportunity to stimulate demand for Maine potatoes through the use of improved grading, packing, and selling services. An attempt has also been made to interpret the significance of the research in the further development of a cooperative marketing program. In addition, these findings should prove useful to cooperative association members in other areas.

In conducting this study various members of the staffs of the Maine Agricultural Experiment Station and the Farm Credit Administration made important contributions. The author wishes to acknowledge the assistance of Maynard A. Hincks of the Maine Agricultural Experiment Station and Gertrude G. Foelsch of the Cooperative Research and Service Division, Farm Credit Administration, in managing the collection and analysis of much of the data and in preparing some portions of the material for publication in preliminary form. Dr. Herbert W. Mumford, Jr., Cooperative Research and Service Division, collected and analyzed the data from retail stores and prepared a report in greater detail than that offered in this bulletin. The author also wishes to acknowledge the advice and suggestions of Kelsey B. Gardner of the Cooperative Research and Service Division, and the helpful assistance of other members of the staff of the Farm Credit Administration, as well as that of Dr. C. H. Merchant and W. E. Schrupf of the Maine Agricultural Experiment Station.

In the progress of this research, several preliminary reports were prepared and published. In these reports some aspects of the study were analyzed in greater detail than in this bulletin. The reports are listed on p. 146.

TOM G. STITTS,
Chief, Cooperative Research and Service Division.

Contents

	Page
Summary.....	v
Some characteristics of Aroostook County agriculture.....	3
Changes in income from Maine potatoes and in prices paid by farmers for commodities they buy.....	7
Trends in potato production.....	8
A classification of potato-producing areas.....	8
Trends in potato production in the United States.....	10
Trend of potato production in the New England States.....	12
Production as related to acreage and yield.....	12
Production in Aroostook County.....	16
Competition between Maine and other New England States in New England potato markets.....	16
Changing seasons in shipment to market.....	18
Consumption of fruits and vegetables.....	22
Effect of variation in supply upon the price of potatoes.....	24
Need for more cooperative action in potato-producing areas.....	25
The relationship between supply and price.....	26
Marketing potatoes in Aroostook County.....	32
Costs of selling, loading, and shipping potatoes to Boston.....	34
Shipping potatoes to market.....	38
Shipping potatoes by boat.....	38
Carlot receipts of Maine potatoes in Boston.....	40
Diversion and reshipment of potatoes.....	40
Reshipping from Charlestown.....	41
Shipping potatoes by truck.....	43
Boston potato markets.....	44
Some requirements for a good terminal market.....	45
Potato markets in Boston.....	46
The Charlestown Potato Market.....	48
The Boston Market Terminal.....	49
The Faneuil Hall Market.....	50
The steamship docks.....	51
The Regional Farmers' Market.....	51
Desirability of reorganization.....	51
Types of dealers, costs, and practices.....	52
Retail chain stores.....	52
The Charlestown market receivers.....	53
Commission merchants and brokers.....	54
Hucksters and truckers.....	55
Free time and demurrage at Boston markets.....	55
Some costs of operation in the Charlestown Produce Market.....	56
Costs related to volume.....	58
Some reasons for packaging in Boston.....	60
Some packaging practices.....	61
Importance of undergrade potatoes in consumer packages.....	63

	Page
Consumer practices in the purchase and use of potatoes.....	66
Procedure of study.....	66
Use or nonuse of potatoes.....	67
Use of potatoes at meals.....	67
Use of potatoes at the morning meal.....	68
Use of potatoes at the noon meal.....	70
Use of potatoes at the evening meal.....	73
Frequency of purchase.....	75
Size of purchase.....	77
Method of preparing potatoes.....	81
Potato substitutes.....	82
Use of other fresh fruit and vegetable items.....	82
Increasing variety of foods.....	83
Consumer preferences for potatoes.....	85
Method of selection.....	86
Preferences for size.....	89
Preferences for potato appearance.....	92
Preferences for cooking quality.....	92
Prices paid for potatoes by Boston consumers.....	93
Wholesale prices in March, May, and June 1940.....	93
Potato purchases by Boston consumers.....	95
Prices in different weeks as related to package.....	100
Size of consumers' purchases in March and in June.....	101
Family income and kind of package purchased.....	102
Package, price, and source of purchase.....	104
Family income and prices.....	107
Purchases of Prince Edward Island potatoes.....	108
Consumers' buying practices and a marketing program.....	109
Retail distribution of potatoes.....	109
Method and scope of study.....	109
Importance of study to retailers.....	110
The producer's interest in retail practices.....	111
Retail practices in the marketing of potatoes.....	111
Retailers' appreciation of consumer preferences for size.....	113
Sizes and defects in potatoes offered for sale by Boston retailers.....	113
Further analysis of defects.....	116
Relationship between retail price and quality in independent stores.....	117
Relationship between retail price and quality in selected chain-store units.....	119
Relationship between price and size in selected chain-store units.....	120
Comparison of gradings of 100-pound burlap bags inspected at selected retail units of three large chain stores in Boston, March 23 to April 6, 1940.....	122
Retailers' gross margin.....	122
Relationship between retail cost and quality in retail stores.....	124
Potato grades and standards.....	126
Consumer recognition of defects.....	129
Adaptability of United States grades.....	130
Consumer preference as a basis for grades.....	132
Appendix—Sampling procedure.....	134

Summary

THE POTATO crop of Aroostook County, Maine, is marketed by a large number of individuals and organizations in the State. It is handled by several dealers and organizations in Boston. These individuals, organizations, and dealers have varied interests and marketing philosophies guiding their marketing activities. Under these conditions it is difficult to develop a consistent marketing program except as the growers themselves organize and direct their marketing activities. This research was planned to gather and present information which would review the present situation in marketing Maine potatoes in Boston. Such a review should serve to point out some of the essentials which growers should consider in a comprehensive marketing program for Aroostook County.

Aroostook County contains a highly specialized potato-producing area. Changing sources of supply have characterized the potato industry in the United States since 1929, in Aroostook County there has been no important change in either acreage or yield since that time, partly because the farmers and the soil are efficient in potato production, but probably also because growers there had few production alternatives.

The demand for potatoes is inelastic and, therefore, small crops may sell for more money than large ones. If producers in important production areas were strongly organized they could make use of marketing agreements and stabilize their incomes. Without such organization in the major potato-producing areas, it is more difficult to accomplish such results. Byproduct enterprises are also a desirable adjunct of organization to regulate supplies. Lacking the organization to approach the problem cooperatively on a national basis, producers in the various producing sections are limited to use of less effective competitive devices.

Several wholesale markets in Boston receive potatoes for redistribution. None of these markets has adequate facilities to serve at one time and place all the buyers and sellers who might wish to trade there. Transportation facilities are limited, particularly at the Faneuil Hall Market. At the other two markets truck arrivals are prohibited, and no provision is made for a farmers' market. At the Boston Market Terminal, there has been an attempt to limit the trading to that of wholesale dealers, and retailers making small purchases are not encouraged. As a result, produce frequently is hauled

from one wholesale market to another, increasing marketing cost and damage to perishable products.

Dealers in the Charlestown market have potato stores and are equipped to provide necessary rehandling services. Since most of the potatoes have to be graded at the time of original packaging in Maine, however, the services rendered there should be as complete as possible, minimizing the need for extra costs at Charlestown.

The volume of potatoes passing through the Charlestown market has been declining for the following reasons: (1) Reshipment of potatoes from Charlestown has been decreasing in favor of direct shipment from producers in Maine to destinations farther south; (2) direct purchasing by chain stores has decreased the volume of potatoes for the Boston market, previously handled by the wholesale dealers at Charlestown; and (3) increased potato production in southern New England has decreased the proportion of Maine potatoes in the Boston market. As the volume of potatoes passing through the Charlestown market is reduced, the costs of some dealers operating there will rise, making it necessary for them to take wider operating margins or seek additional sources of profit in marketing practices.

The potato-mixing practice, sometimes widely used, needs careful study because of its effect on prices and also because it may reflect the need for different packaging practices in Maine, where the cost is lower.

One remedy for unsatisfactory terminal wholesale markets and practices is for producers to control their own products into the market far enough to avoid unnecessary costs and undesirable practices.

Almost 98 percent of the families interviewed in Boston and the adjacent metropolitan areas included in this study reported that they used potatoes. In March when prices and qualities were relatively stable, the peck package was the favorite. Small families and some families with larger-than-average incomes were more likely to make small purchases than were the average-sized families. Later in the year, when old-crop Maine potatoes were disappearing and new-crop potatoes were coming from the South, packages smaller than a peck were most frequently purchased. Declining prices and the less stable qualities were given as the reasons why consumers purchased in smaller quantities. A marketing program based exclusively on the sale of a branded peck package, therefore, would not be the most satisfactory one under the conditions found in Boston in the month of June 1940.

Purchases of potatoes, for family use were made frequently in March and even more frequently when smaller packages were being purchased in June. Thus it is important to producers as well as to retailers that potatoes purchased give consumers satisfaction.

More than 95 percent of the families interviewed reported the use of potatoes at the evening meal. Baking was the most popular method of preparation. This indicates the importance of baking preferences

and suggests that this preference should be recognized by producers in growing and marketing.

The use of potatoes at morning and noon meals was most frequent in large families and in families with lower incomes. This emphasizes the importance of potatoes as food in those population groups. If food prices and living costs were increased, a larger proportion of the population might find it impossible to gratify their desire for variety in foods and use more of those items, such as potatoes, that are less costly.

Family interviews show that satisfaction in the use of potatoes would be increased if they were sized more carefully. Preferences were mostly for potatoes larger than 2 inches in diameter, but rarely for potatoes larger than 3 inches. Preferences were also for potatoes sized to a range not exceeding one-half inch in diameter. Under present marketing practices, potatoes are rarely sized this way.

Boston consumers purchased potatoes at a wide range in prices each day. This wide range in prices and the fact that the consumers with high incomes were more likely to pay the higher prices supports the conclusion that some potatoes could be sold at prices yielding a reasonable return for more care in grading and packaging. The limited number of persons with high incomes and the low prices paid by many consumers suggest that the gains from improved merchandising practices are likely to come partly from cost reduction through sale of larger volume.

Retailers were aware of the preference on the part of consumers for potatoes of medium size and for potatoes sized closely around an average of $2\frac{1}{2}$ inches in diameter. Retail prices, however, did not show a close relationship between the price paid by the consumer and the percentage of the potatoes which were under $2\frac{1}{4}$ inches in diameter. Neither did retail prices reflect any close relationship between the price paid by the consumer and the percentage of defects as interpreted under the standards for U. S. No. 1 potatoes. To the consumer, therefore, retail price was not a valuable guide to quality as described by these inspection characteristics.

Retail margins varied from very low ones to margins as high as 15 cents or more per peck. They averaged 7 cents per peck, or about 15 to 20 percent of the retail price. Judging from margins taken for other fresh fruits and vegetables and for some other food items, 17 percent was not an unusually large margin.

The wide range in margins taken by retailers suggested that the lack of relationship between the retail price and the percentage of various qualities found within the retail package might be due to the retailer's method of applying margins. The retailer's cost was correlated with the qualities found in the packages, and this correlation indicated that some retailers do take into consideration the percentage of small potatoes in the package when they purchase for redistribution

to their consumer-patrons. The range of variation, however, still indicated that retail cost was not a very reliable guide to the sizing of the potatoes in the package. Retail cost as compared with the percentage of various defects found in the packages indicated that when the retailer purchased U. S. No. 1 potatoes, no further attempt was made to hold the percentage of defects at a low figure.

The data suggest that producers have not made the fullest use of the Federal-State Inspection Service. Thus the producers in Maine have not accomplished the degree of standardization which was desirable and perhaps possible by preparing more standardized description of the contents of packages and referring these descriptions to the inspection service for interpretation in grading the crop. The inspection service may be used simply as an authority in determination of the grade of a marketable lot of product or its services may be enlisted to improve the quality of the product offered for sale. Producers and their cooperative marketing associations should coordinate their objectives with those of the inspection service to render improved services to the producers, and to the consumers who are their customers.

MARKETING MAINE POTATOES IN MAINE AND IN BOSTON

POATATO GROWERS in Maine, as elsewhere, have an interest in the marketing of their crop. In Aroostook County this interest is unusually lively because potatoes are by far the most important source of cash farm income. Producers in this county, therefore, specialize in producing and marketing this crop.

Cooperative marketing has been tried. One cooperative, formed in 1922, ceased to function in 1926. An association organized in 1932 has operated in a limited way with success. Although limited in the scope of its services, it has made one particularly important contribution through the cooperative experience which it has provided to a considerable number of growers and a management staff. The successful operation of this farmers' organization over a period of years, together with the accumulation of cooperative experience, has equipped this group of producers to extend the scope of their cooperative marketing activity.

Leaders among the Maine potato growers were of diverse opinions as to the proper steps to be taken. Some believed, for instance, that more careful sizing of potatoes in packages was necessary to improve the existing marketing situation. Others believed that present grading and standardization practices were adequate, and all that was needed was an advertising program to bring the product more directly to the consumers' attention. Others believed that the problem lay in the field of shipping damage and disease control. Still others felt that the principal problem lay in the domination of retail distribution by agencies not interested so much in the quality of the product as in the margin which they derive from its sale and the consequent subjugation of ideas of quality and consumer satisfaction to that of profit from distribution. In addition, there were groups who believed that the problem lay mostly in the field of competitive pricing, and that Maine's marketing problem lay almost entirely in the field of more efficient distribution on a cost basis alone.

With the passage of the potato tax law, administered by the Maine Development Commission, interest in marketing problems was manifested and requests were made to the Maine Agricultural Experiment

Station to conduct studies of the marketing of potatoes. These requests emphasized the need for studies at terminal markets, especially those dealing with consumer preferences. Some of the funds made available under the potato tax were placed at the disposal of the Maine Agricultural Experiment Station, where a program for marketing studies had been previously formulated. Acting upon a request from Maine Potato Growers, Inc., a cooperative association, the Cooperative Research and Service Division of the Farm Credit Administration also became interested in the marketing problem. As a result, the Maine Agricultural Experiment Station and the Cooperative Research and Service Division pooled resources for the purpose of studying some phases of potato marketing both in Maine and in Boston to provide growers with information which would be useful in further developing their marketing program. The results of this research are the subject matter of this report, and will be presented according to the following general plan:

1. A review of trends for the industry, as well as for Aroostook County, based on data from the United States Bureau of the Census and the United States Department of Agriculture, as well as results from research previously reported. This review provides a background for the potato enterprise of Aroostook County. It shows that some of the potato-marketing problems in Aroostook County are really industry problems which can best be solved by cooperative action on an industry basis. Lacking cooperative organization on an industry basis, Aroostook County producers must resort to competitive practices which, although likely to be less effective than cooperative action in the solution of their problems, may nevertheless partly solve those problems until the time when a more general and effective approach is possible.

2. A description of markets and marketing practices at shipping points and in Boston, as they relate to the distribution of potatoes from Maine. This description points out some of the steps which might be taken by Maine potato producers for more efficient distribution of their product and to preserve the integrity of the reputation for their brands and trade-marks, and for more equitable distribution of potatoes to consumers and of the returns from potato marketing to producers.

3. The practices and preferences of consumers in the purchase and use of potatoes were studied for various incomes, nationalities, and sizes of family groups. Some steps are recommended to Maine producers for packing their potatoes so they will be more acceptable for use in Boston households.

4. Data are presented showing prices paid for potatoes by Boston consumers in various population groups, as related to size and type of package. This material is particularly useful in showing the range in

prices paid by consumers for potatoes, and in giving some idea of the possibility of marketing a considerable volume of potatoes at higher prices.

5. A brief discussion of the methods and practices of selling potatoes in Boston retail stores is presented, together with a discussion of the relationship between retail prices and percentage of defects and various sizes of potatoes in retail packages. This part of the report shows that, under the present conditions of marketing, the retail price is not a satisfactory guide to the quality of potatoes likely to be found in the retail package.

6. A discussion of grading and standardization including suggested means by which a cooperative marketing association may achieve improvements in standardization of its product and in the services rendered to its members.

The facts set forth in this report are presented in the light of their importance to the farmers of Aroostook County.

Although this research was restricted to Maine and Boston, the conclusions undoubtedly apply to some potato producers in other areas and in other markets. It is impossible to point out which conclusions have limited and which general application. However, growers in other areas and their cooperative marketing associations may find in this report data and discussion which they will recognize as applicable to their own situations.

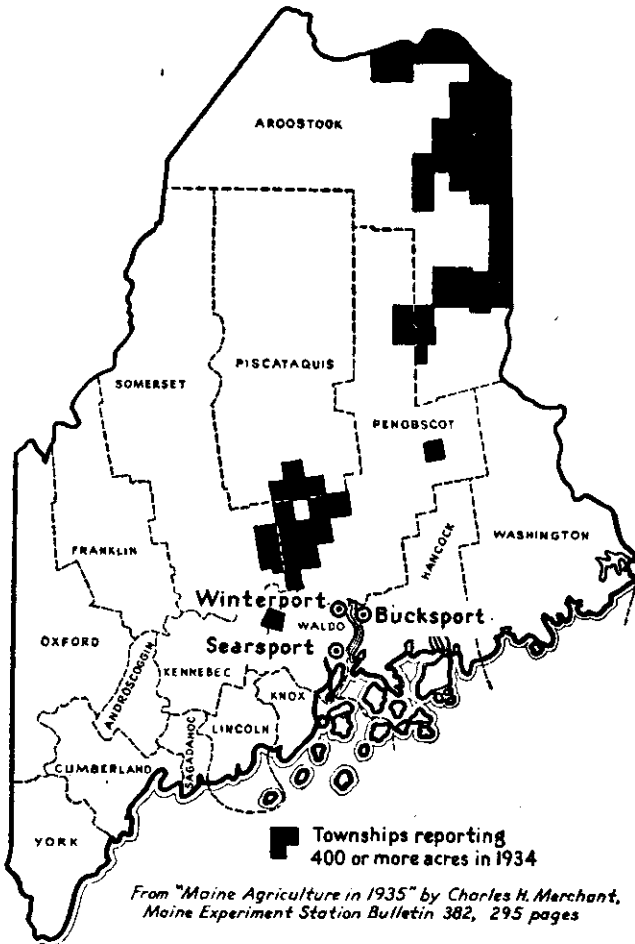
From the point of view of the Cooperative Research and Service Division of the Farm Credit Administration, the results of this research are particularly adaptable for use by producers who are members of cooperative marketing associations. Other producers and other marketing organizations may, nevertheless, find the material helpful in making their marketing procedures more efficient.

SOME CHARACTERISTICS OF AROOSTOOK COUNTY AGRICULTURE

TRENDS in production in some important potato-producing areas in the United States have altered the competitive situation between these areas in some important markets. A brief review of United States census data for Aroostook County and some general statistics of production serve to point out the nature of these problems and their significance to producers in Maine.

Practically all the potato-producing area in Aroostook County is included in the narrow section next to the New Brunswick Canadian line, as shown in figure 1. The area is about 90 miles long and varies in width from about 6 to 30 miles. The soil known as the Caribou loam is the predominating soil of this section and is well adapted for the production of potatoes. The topography of the country is such

FIGURE 1.—PRINCIPAL POTATO-PRODUCING AREAS IN MAINE AND PORTS ENGAGED IN BOAT SHIPMENTS.



The Intensive Potato-Producing Area of Aroostook County Lies in a Narrow Strip Next to the New Brunswick-Canadian Line.

that the fields can be laid out in large rectangular blocks, easily cultivated by machinery. (Figs. 2 and 3.) Many of the fields are rolling, however, and therefore subject to erosion.

According to the 1940 census of agriculture, Aroostook County, Maine, has an area of approximately 4,355,200 acres of which 793,218 acres, or about 18 percent, was in farms in 1939; and 334,667 acres, or about 42 percent, of the farm acreage was classified as cropland. The potatoes grown that year were reported as occupying over 35 percent of the cropland (fig. 4). The remainder was used mostly for hay, oats, and other small grains, was idle or fallow or in plowable pasture.

The number of farms in Aroostook County was reduced between 1930 and 1940 as indicated in table 1, over 700 having gone out of

existence in that 10-year period according to census enumerations. The average size of all farms reporting was increased slightly. This shows the tendency for some potato growers in Aroostook County to attempt to increase their efficiency either in producing or in

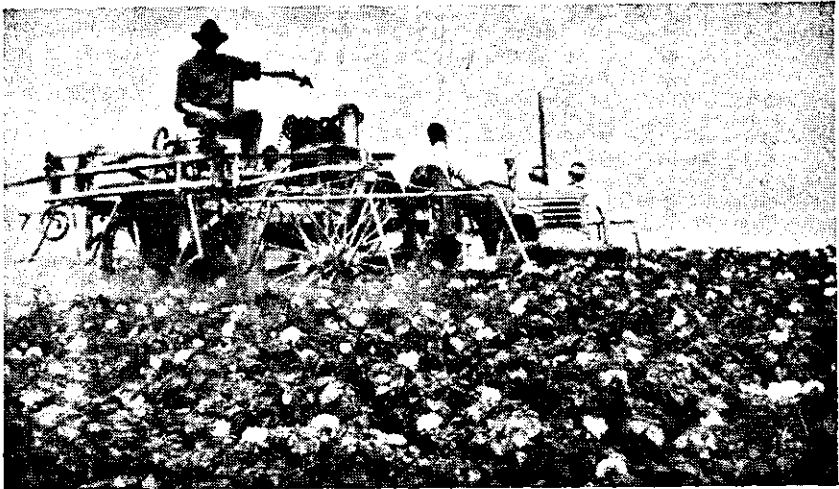


FIGURE 2.—Spraying potatoes. For the large acreages, power equipment is used.

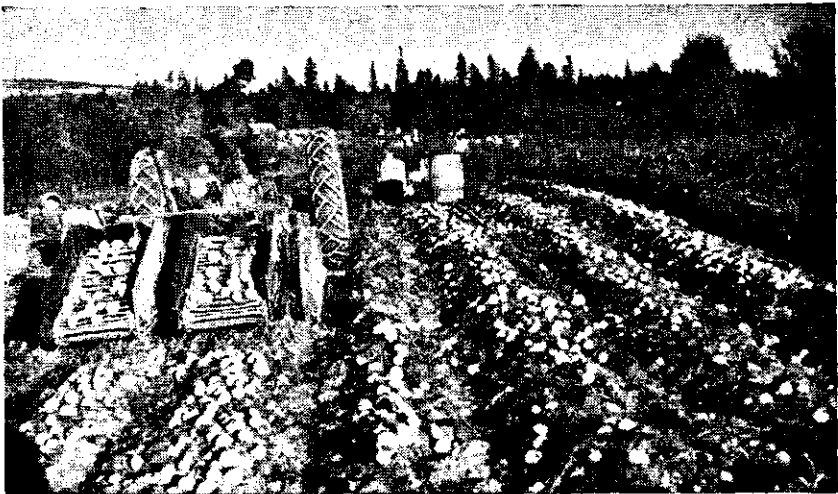


FIGURE 3.—Digging potatoes. Power equipment is used, but potatoes are picked up by hand. Yields reported sometimes exceed 500 bushels per acre and the average for the county is between 250 and 300 bushels per acre.

marketing by operating larger acreages. The process to date has not been entirely that of absorbing small holdings by larger growers since there was reported a reduction of more than 75,000 acres in the land in farms between 1930 and 1940.

The value of all farms reported in Aroostook County declined fol-

lowing 1930. This was partly as a result of the declining acreage mentioned above. The value of farms declined, however, from an average of \$10,345 in 1930 to \$6,701 in 1940. Value of buildings declined in the 10 years between 1930 and 1940 as did the value of farm implements and machinery.

TABLE 1.—Number, acreage, and value of farms in Aroostook County, Maine, on census enumeration dates, 1930 and 1940

Census date	Farms reported	Average size of farm	All land in farms	Value of farms ¹	Value of buildings	Farm implements and machinery
	<i>Number</i>	<i>Acres</i>	<i>Acres</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>
Apr. 1, 1930.....	6,459	134.4	868,400	66,817	25,323	10,628
Apr. 1, 1940.....	5,706	139.0	793,218	38,238	15,907	7,413

¹ Land and buildings.

Source: U. S. Bureau of the Census, Agriculture, Maine, First Series, 1941.

The census data suggest that in Aroostook County during this 10-year period the most efficient growers increased their acreage and some of the less productive land was abandoned. As a result there were fewer farmers, fewer farms, less farm acreage, but more acres per farm.

The changing size of Aroostook County's agricultural enterprises is shown again in table 2. Since 1929 the land used for crops and the acreage used for potatoes have declined, but the potato acreage has been slightly more than one-third of the cropland of the county. The number of farms reporting crops declined as did the number reporting potatoes. According to these data about 90 percent of Aroostook County farmers raised potatoes.



FIGURE 4.—Potato acreage in Aroostook County. In some parts of the county potatoes are almost the only crop grown.

TABLE 2.—*Land used for crops and for potatoes in Aroostook County, Maine, in census years 1929 and 1939*

Census year	Land used for crops	Land used for potatoes	Percentage used for potatoes	Farms reporting crops ¹	Farms reporting potatoes	Percentage of farms reporting potatoes
	Acres	Acres	Percent	Number	Number	Percent
1929	384,366	132,887	34.6	6,550	5,925	90.4
1939	334,667	119,540	35.7	5,554	5,003	90.1

¹ Farms reporting crops harvested and crop failure.

Source: U. S. Bureau of the Census, Census of Agriculture, 1930 and 1940.

Changes in Income from Maine Potatoes and in Prices Paid by Farmers for Commodities They Buy

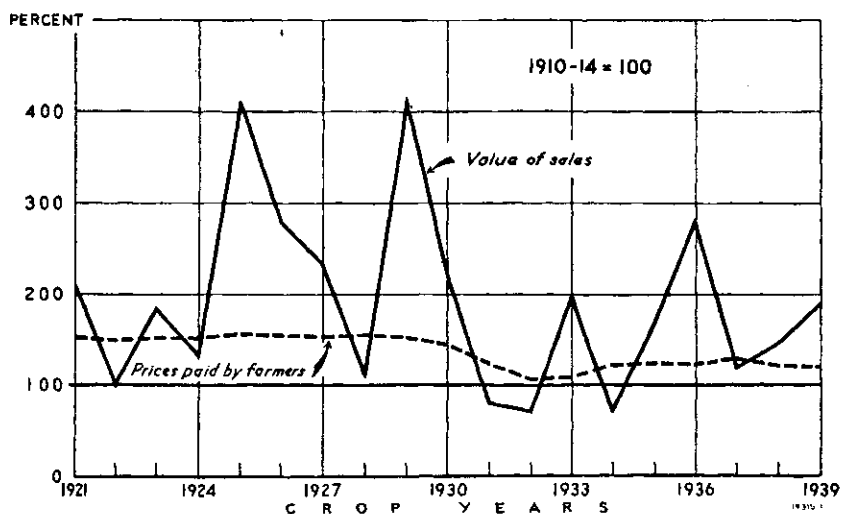
Data from 165 farms surveyed by the Maine Agricultural Experiment Station in 1928, 1929, and 1930 showed that more than 85 percent of the cash farm income in Aroostook County was derived from potatoes sold.¹ The farm population of the area was primarily dependent for cash income on the production of potatoes.

The estimated value of sales of Maine potatoes, by crop years, was converted into relatives so as to estimate the trend of income for comparison with the trend of cost of commodities purchased by farmers in Maine. Since such an index number of costs for Maine farmers was not available, the index of prices paid by farmers as calculated for the United States was used on the assumption that a large proportion of the cost items which enter into the farmers' expenses vary similarly in Maine and in other States. Prices of course do not reflect costs directly but give some indication of what the costs were likely to be. These data are presented in figure 5 and show that incomes varied more than the costs. The years from 1925 to 1930, inclusive, were generally good years for Maine potato growers. Only in 1928, the year of an exceptionally large crop, did their income fall to a very low level. In 1925 and 1929 particularly, incomes exceeded the indication of cash outlay by a considerable amount. After 1929 both the income to potato producers and the prices of the commodities farmers purchased declined, but the decline in income was much the greater.

To operate without losses under conditions approximating those shown in figure 5 for the years after 1930, a producer would need to adopt as many efficient practices as were available to him, among which should be included efficiency in marketing.

¹Schrumpf, W. E. COSTS AND RETURNS IN PRODUCING POTATOES IN AROOSTOOK COUNTY, MAINE. 1937. Maine Agr. Expt. Sta. Bul. 390. 231 pp.

FIGURE 5.—INDEX NUMBERS OF VALUE OF SALES OF MAINE POTATOES AND OF PRICES PAID BY FARMERS IN THE UNITED STATES FOR THE COMMODITIES THEY BUY, 1921-39.



Since 1929 There Have Been Several Years in Which Farmers Failed to Receive Enough from Their Crops to Cover the Cash Outlay for Producing Them.

Trends in Potato Production

Although potatoes are produced generally throughout the United States, the production and marketing seasons vary. New potatoes, for instance, first come to market from Texas and southern Florida. Potato carlot shipments from Louisiana, Alabama, South Carolina, North Carolina, Georgia, Arkansas, Oklahoma, and California are likely to come shortly after those from southern Texas and Florida, but coincide with part of the movement from the earlier areas. Slightly later still, shipments of potatoes start from the Eastern Shore of Maryland and Virginia, from New Jersey, and from Long Island, N. Y.

In California, potato marketing goes on throughout the entire year, because in that State potato production has both early and late characteristics. Marketing seasons for all the late States are usually much longer than those for the early States, because the harvest comes in the fall. The potatoes are stored and marketed throughout the winter and spring and into the early summer of the following year. (Fig. 6.)

A Classification of Potato-Producing Areas

Because of the differing production seasons and also because of differences in the characteristics of potatoes and the methods of their marketing in the various sections of the United States, a classification

of these sections has been prepared for the purpose of presenting statistical information on the production and marketing of the crop. This is necessary in presenting production and price information because the marketing problem each year is altered by changes in production in the different marketing areas. For example, an important change in production in any producing section is likely to affect marketing problems in other producing sections throughout the rest of the season.

The classification of States which has been developed in the Agricultural Marketing Service appears in table 3, and this classification will be the basis for presenting data showing production trends in the various producing areas.

The 11 early potato States were previously described as those which produce the early crop and market their surplus mostly between midwinter and June.² Intermediate States fill in the gap between declining marketings from the early States and the harvest from the surplus late potato States. The 18 surplus late potato States produce about two-thirds of all the potatoes consumed for food in the United States. The crop is harvested in early fall and most of it is marketed over the following 10 months. The 12 other late potato States are those in which there is production, but not in sufficient amount to create an important marketing surplus. They are listed as late potato States because the characteristic of their production is more like that of the late States than of the early or intermediate States.

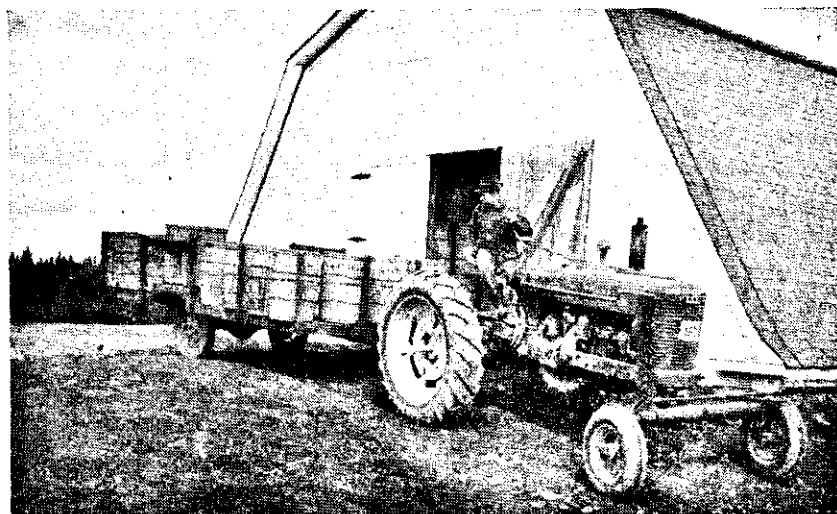


FIGURE 6.—Hauling to farm storage. Many growers have farm storage where they haul the barrels direct from the fields. Those who do not have farm storage haul their potatoes to trackside storage.

² Potatoes from Kern County, Calif., are sometimes classified as part of the early crop.

TABLE 3.—*Classification of potato-producing States into production and marketing groups*

Early States (11)	Intermediate States (7)	Surplus late States (18)	Other late States (12)
North Carolina. South Carolina. Georgia. Florida. Tennessee. Alabama. Mississippi. Arkansas. Louisiana. Oklahoma. Texas.	New Jersey. Delaware. Maryland. Virginia. Kentucky. Missouri. Kansas.	Maine. New York. Pennsylvania. Michigan. Wisconsin. Minnesota. North Dakota. South Dakota. Nebraska. Montana. Idaho. Wyoming. Colorado. Utah. Nevada. Washington. Oregon. California.	New Hampshire. Vermont. Massachusetts. Rhode Island. Connecticut. West Virginia. Ohio. Indiana. Illinois. Iowa. New Mexico. Arizona.

Source: U. S. Agricultural Marketing Service, Agricultural Statistics, 1940.

Trends in Potato Production in the United States

Estimates of the total production of potatoes in the various States were combined by producing areas as shown in table 4. In this table also are shown the estimates of production in nine of the most important potato-producing States of the surplus late area. Because of the variation in production from year to year, the data are shown in four 5-year periods, covering potato production for a total of 20 years.

The data show that for the first two 5-year periods the total production in the United States was not much changed. The estimate indicates that average production in each of these periods was about 358,000,000 bushels per year. The third period was the one in which the depression following 1929 reached its greatest depth. Average annual potato production for this period was increased approximately 21,000,000 bushels from the two preceding 5-year periods. The fourth 5-year period indicates that for the country as a whole, average annual potato production declined about 7,000,000 bushels but still exceeded production of the first two periods by about 14,000,000 bushels. For the whole 20 years, therefore, the trend of production has been slightly upward, but at the end of the period, the trend was down.

For the "surplus late producing States," there was a tendency for production to decline in the second 5-year period, to increase in the third period, and in the fourth period to be about the same as it was 20 years earlier. In the "other late States," the trend in production was irregularly upward. In the "intermediate States," production advanced in the second 5-year period, but declined later and in the last period was approximately 6,000,000 bushels less than in the first one. In the "early States," however, the trend in production

TABLE 4.—*Estimated production of potatoes by seasonal groups and selected States, 5-year averages and percentages, 1921-25 to 1936-40*

Group and State	Average production				Percentage of United States total			
	1921-25	1926-30	1931-35	1936-40	1921-25	1926-30	1931-35	1936-40
	<i>1,000 bushels</i>	<i>1,000 bushels</i>	<i>1,000 bushels</i>	<i>1,000 bushels</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Surplus late:								
Maine	33,362	40,735	44,946	43,043	9.3	11.4	11.9	11.6
New York	32,723	25,692	31,929	27,050	9.1	7.2	8.4	7.3
Pennsylvania	21,878	22,731	26,884	23,888	6.1	6.3	7.1	6.4
Michigan	29,340	21,954	28,486	25,930	8.2	6.1	7.5	7.0
Wisconsin	27,693	23,945	25,012	27,918	7.7	6.7	6.6	4.8
Minnesota	35,788	30,191	26,068	20,335	10.0	8.4	6.9	5.4
Idaho	12,879	19,023	24,028	28,554	3.6	5.6	6.3	7.7
Colorado	13,659	15,511	12,646	15,126	3.8	4.3	3.3	4.1
California	9,161	7,918	9,238	14,996	2.6	2.2	2.4	4.0
Other	44,837	42,388	42,091	44,110	12.5	11.8	11.1	11.8
Total	261,320	250,988	271,328	260,950	72.9	70.0	71.5	70.1
Other late	36,746	37,099	41,623	38,975	10.3	10.4	11.0	10.5
Intermediate	38,663	40,095	33,039	32,915	10.8	11.2	8.7	8.8
Early	21,589	30,073	33,337	39,380	6.0	8.4	8.8	10.6
United States	358,318	358,255	379,328	372,220	100.0	100.0	100.0	100.0

Sources: Data for 1921-35 are from Strowbridge, J. W., *Origin and Distribution of the Commercial Potato Crop*, U. S. Dept. Agr. Tech. Bul. 7, 63 pp. Rev. April 1939; for 1936-38 from U. S. Agricultural Marketing Service, *Agricultural Statistics*; and for 1939-40 from U. S. Agricultural Marketing Service, *Gen. Crop Report*, Dec. 1940.

has been steadily upward, the average for the last 5-year period was slightly less than twice that of the first period.

Among the most important of the "surplus late States," production in Maine during the first period was exceeded by that in Minnesota alone, and in all the three later periods production in Maine exceeded that of any other State. In Wisconsin and Minnesota the trend of production was downward; whereas, in Idaho, the production increased and in California it increased sharply during the last period.³ In New York production also declined, but this declining trend for the State as a whole was not followed on Long Island as indicated in table 5, which shows that production of potatoes in Suffolk County, Long Island, increased. Some of these potatoes, especially in years of large crops, as 1940-41, are sold in New England through Providence, R. I. In all other States the production trend was irregular.

TABLE 5.—*Estimated acreage and production of Long Island potatoes 1934-40*

Year	Nassau County		Suffolk County	
	Acreage	Production	Acreage	Production
	<i>Acres</i>	<i>1,000 bushels</i>	<i>Acres</i>	<i>1,000 bushels</i>
1934	9,100	2,350	33,200	6,788
1935	9,000	1,809	34,000	7,166
1936	8,800	4,228	33,200	6,399
1937	9,000	2,357	34,000	8,058
1938	8,800	2,576	34,200	8,684
1939	9,000	1,418	35,500	7,007
1940	9,200	2,998	36,200	10,213

Source: Federal-State Agricultural Statistical Service, Albany, N. Y.

³ Increased production in California occurred mostly in Kern County. These are more properly classed as early-crop potatoes, as they reach eastern markets in the spring.

Trend of Potato Production in the New England States

In the New England States, excluding Maine, trends of production during the past 20 years also varied as indicated in table 6. These New England States are listed among the "other late States" in table 4.

Although they are potato-producing areas, their total production is less than that required to satisfy the demand of their population. In the five New England States presented here, production declined during the period from 1926 to 1930 as compared with the period 5 years earlier but was materially increased after the depression following 1929. This increase was confined to the States of New Hampshire, Massachusetts, Rhode Island, and Connecticut, since the production in the State of Vermont shows a tendency to decline. The production of 9,822,000 bushels estimated as the average for the 5-year period, 1936 to 1940, exceeded that of the 5-year period, 1921 to 1925, by over 2,000,000 bushels, or equivalent to about 3,000 carloads. This increased production in the other New England States will be considered further in connection with the decline of shipments of potatoes from Maine to the Charlestown Market in Boston.

TABLE 6.—*Estimated potato production in selected New England States, 5-year averages, 1921-25 to 1936-40*

State	1921-25	1926-30	1931-35	1936-40
	<i>1,000 bushels</i>	<i>1,000 bushels</i>	<i>1,000 bushels</i>	<i>1,000 bushels</i>
New Hampshire.....	1,362	1,239	1,505	1,494
Vermont.....	2,478	2,175	2,393	2,112
Massachusetts.....	1,801	1,436	2,145	2,512
Rhode Island.....	294	303	582	768
Connecticut.....	1,714	1,672	2,580	2,936
Total.....	7,649	6,825	9,205	9,822

Sources: Data for 1921-35 from Strowbridge, J. W., *Origin and Distribution of the Commercial Potato Crop*, U. S. Dept. Agr. Tech. Bul. 7, 63 pp., Rev. April 1939; for 1936-38, U. S. Agricultural Marketing Service, *Agricultural Statistics*; and for 1939-40, U. S. Agricultural Marketing Service, *Gen. Crop Report*, Dec. 1940.

Production as Related to Acreage and Yield

Trends in acreage and yield are the important causes of trends in production. Table 7 and figure 7 show these relationships for a 20-year period beginning with 1921 and ending with 1940. Throughout the whole period a slight tendency to increase is noted for production in that, when expressed as a percentage of the average, more of the earlier figures were below 100 percent; whereas, in the later years of the period, more of the production figures were above average. Acreage and yield show different trends, however. There has been some evidence of a tendency after 1934 for acreage to decline, whereas yields increased. Two reasons are usually given for the increase in yields. The first is the extension of cultural methods, long practiced in Maine, into other areas, particularly the South. Increased use of

fertilizer has been the most important characteristic of these cultural methods. Also introduction into other areas has been partly caused by Maine farmers extending their operations into these areas.

TABLE 7.—Potatoes: Acreage, yield, and production, United States, 1921-40

Year	Acreage harvested ¹	Average yield per acre ¹	Production	Acreage harvested as a percentage of average	Yield per acre as a percentage of average	Production as a percentage of average
	1,000 acres	Bushels	1,000 bushels	Percent	Percent	Percent
1921	3,598	90.4	325,312	110.2	80.2	88.7
1922	3,901	106.5	415,373	119.4	94.5	113.2
1923	3,378	108.5	366,356	103.4	96.3	99.0
1924	3,106	123.7	384,166	95.1	109.8	104.7
1925	2,810	105.5	296,466	86.0	93.6	80.8
1926	2,811	114.4	321,607	86.1	101.5	87.7
1927	3,182	116.2	369,644	97.4	103.1	100.8
1928	3,499	122.1	427,249	107.1	108.3	116.5
1929	3,019	110.0	332,204	92.4	97.6	90.6
1930	3,103	109.8	340,572	95.0	97.4	92.8
1931	3,467	110.8	384,125	106.2	98.3	104.7
1932	3,549	106.1	376,425	108.7	94.1	102.6
1933	3,412	100.3	342,306	104.5	89.0	93.3
1934	3,597	112.9	406,195	110.1	100.2	110.7
1935	3,541	109.1	386,380	108.4	96.8	105.3
1936	3,063	108.4	331,918	93.8	90.2	90.5
1937	3,185	124.1	395,291	97.5	110.1	107.8
1938	3,023	123.8	374,163	92.6	109.8	102.0
1939 ²	3,027	120.3	364,016	92.7	106.7	99.2
1940 ²	3,053	130.3	397,722	93.5	115.6	108.4
Average	3,266	112.7 ²	366,770	100.0	100.0	100.0

¹ There is some evidence that the decline in acreage and the increase in yields during the last 5 years were the result of a growing tendency on the part of farmers to report "net" acres according to practices in measuring soil-conservation acreages.

² Preliminary.

Sources: Data from 1921-39 from U. S. Agricultural Marketing Service, Agricultural Statistics, 1940; for 1940 from U. S. Agricultural Marketing Service, Gen. Crop Report, Dec. 1940.

The second cause of increased production through larger yield per acre was the increased use of the White Rose, Chippewa, and Katahdin varieties, which are reported as contributing to increased yields, particularly in the South. Very little Maine acreage of these varieties was certified for seed prior to 1933 but the increase in acreage of certified Chippewas and Katahdins since that date has been very rapid, as shown in table 8. This increase in certified-seed acreage, as noted for Maine, was further increased from New York, New Brunswick, Nova Scotia, and Prince Edward Island.

The increase in acreage of certified seed of these two varieties seems to be particularly related to the trend of increase in yields per acre for the United States since 1936 as shown in figure 7. This may in fact be true but the conclusion that these two trends are directly related should be reserved until other years prove their continuation.

Trends in acreage and yield in Maine do not parallel those for the United States as a whole, as shown in figure 8 and table 9. Trend in acreage was sharply upward from 1921 to 1931 and production increased proportionately. The data do not indicate any change in yields, however, since the yield data fluctuate irregularly from the

TABLE 8.—*Certified seed potatoes: Maine acreage passing final inspection, 1933-39*

Year	Katahdin		Chippewa		Year	Katahdin		Chippewa	
	Acres ¹	Acres	Acres	Acres		Acres	Acres	Acres	Acres
1933	42				1937	1,099			1,990
1934	126		1		1938	1,439			593
1935	598		30		1939	2,424			1,644
1936	587		302						

Source: Maine State Department of Agriculture Crop and Livestock Review, 1939.

TABLE 9.—*Potatoes: Acreage, yield, and production in Maine, 1921-40*

Year	Acreage harvested	Average yield per acre	Production	Acreage harvested as a percentage of average	Yield per acre as a percentage of average	Production as a percentage of average
				Percent	Percent	Percent
	1,000 acres	Bushels	1,000 bushels	Percent	Percent	Percent
1921	133	280	37,240	84.9	108.2	92.0
1922	150	170	25,500	95.7	65.7	63.0
1923	122	260	31,720	77.8	100.5	78.3
1924	138	296	40,848	88.1	114.4	100.0
1925	126	250	31,500	80.4	96.6	77.8
1926	125	285	35,625	79.8	110.1	88.0
1927	157	230	36,110	100.2	88.9	80.2
1928	176	220	38,720	112.3	85.0	95.6
1929	166	292	48,472	105.9	112.8	119.7
1930	179	250	44,750	114.2	96.6	110.5
1931	186	258	47,988	118.7	99.7	118.5
1932	170	238	40,460	108.5	92.0	99.9
1933	150	280	42,000	95.7	108.2	103.7
1934	171	324	55,404	109.1	125.2	136.8
1935	160	240	38,400	102.1	92.7	94.8
1936	161	285	45,885	102.7	110.1	113.3
1937	170	280	47,600	108.5	108.2	117.5
1938	167	242	40,414	106.6	93.5	99.8
1939	162	230	37,260	103.4	88.9	92.0
1940 ¹	165	267	44,055	105.3	103.2	108.8
Average	156.7	258.8	40,497.6	100.0	100.0	100.0

¹ Preliminary.

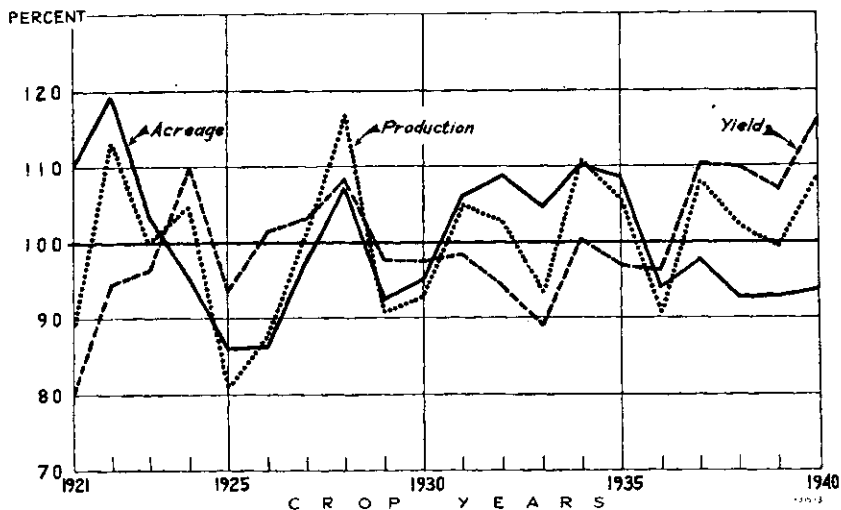
Sources: Data for 1921-38 from Maine State Dept. Agr. Crop and Livestock Review, 1939; and for 1939-40 from U. S. Agricultural Marketing Service, Gen. Crop Report, December 1940.

TABLE 10.—*Potatoes: Acreage, yield per acre, and production in Aroostook County, 1930-40*

Year	Acreage harvested	Average yield per acre	Production	Acreage harvested as a percentage of average	Yield per acre as a percentage of average	Production as a percentage of average
				Percent	Percent	Percent
	1,000 acres	Bushels	1,000 bushels	Percent	Percent	Percent
1930	145,960	252	36,782	108.4	91.4	99.2
1931	153,260	275	42,146	113.9	99.7	113.6
1932	137,930	244	33,655	102.5	88.5	90.7
1933	120,000	286	34,320	89.2	103.7	92.5
1934	134,900	348	46,945	100.2	126.2	126.6
1935	126,810	258	32,717	94.2	93.5	88.2
1936	128,080	302	38,680	95.2	109.5	104.3
1937	135,760	300	40,728	100.9	108.8	109.8
1938	134,400	252	33,869	99.9	91.4	91.3
1939	130,370	242	31,550	96.9	87.7	85.1
1940	132,980	275	36,569	98.8	99.7	98.6
Average	134,586.4	275.8	37,087.4	100.0	100.0	100.0

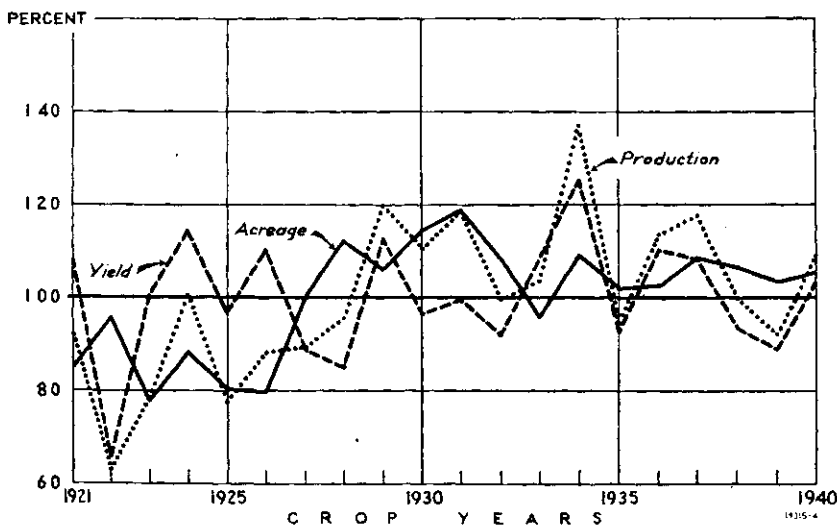
Sources: Data for 1930-38 from Maine State Dept. Agr. Crop and Livestock Review, 1939; and for 1939-40 from the Boston office of the U. S. Agricultural Marketing Service.

FIGURE 7.—POTATOES: ACREAGE, YIELD, AND PRODUCTION IN THE UNITED STATES AS A PERCENTAGE OF AVERAGE FOR THE 20-YEAR PERIOD 1921-40.



Since 1934 There Has Been Some Tendency for Acreage to Decline, Whereas Yields Increased.

FIGURE 8.—POTATOES: ACREAGE, YIELD, AND PRODUCTION IN MAINE AS A PERCENTAGE OF AVERAGE FOR THE 20-YEAR PERIOD 1921-40.



Trend in Acreage was Sharply Upward from 1921 to 1931 and Production Increased Proportionately.

100-percent level throughout the period. The introduction of the Chippewa and Katahdin varieties does not appear to have increased the production efficiency of Maine growers as it may have done that of growers in some other areas. The value of these varieties to Maine growers lies in their disease resistance rather than in their increased productivity.

Production in Aroostook County

Potato acreage in the United States was reduced and yields per acre increased during the last 5 years, a change which was not reflected in Maine. Data do not reveal any similar shifts in production for Aroostook County. There, as in Maine as a whole, yields have fluctuated irregularly around their average throughout the past 11 years, as shown in table 10 and figure 9.

Competition Between Maine and Other New England States in New England Potato Markets

In southern New England there is a large industrial population and consequently an important potato market. The market has been and still is important to Maine producers. Potatoes from Aroostook County are routed into this market partly through the Charlestown Potato Market in Boston. The number of carloads handled through this market has declined since 1930 in many ways coincident with the trend of increase in production in the New England States. The offsetting trends in New England's "nearby" production and in Charlestown receipts from Maine are shown in table 11 and figure 10. Although the data seem conclusive and are undoubtedly highly

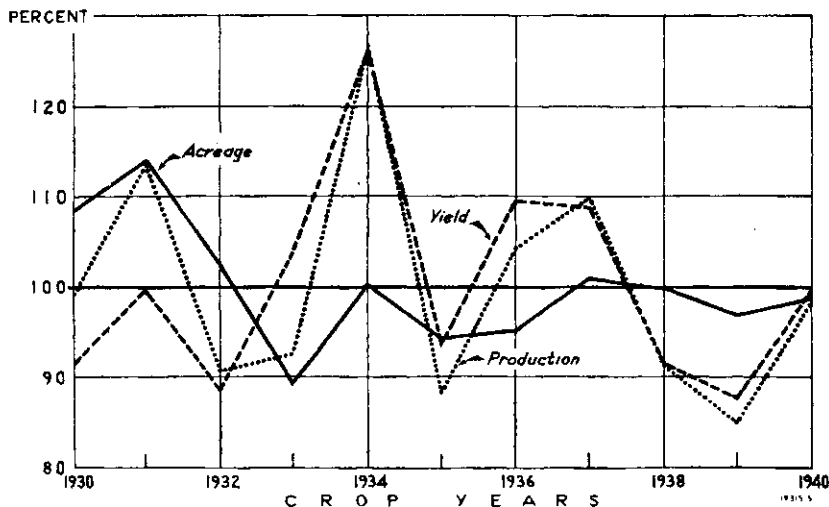
TABLE 11.—Potatoes: Carloads received at Charlestown Market and estimated carloads produced in New England States excluding Maine, crop years 1922-41

Year ending July 1	Receipts at Charlestown Market	Production in New England States, excluding Maine ¹	Year ending July 1	Receipts at Charlestown Market	Production in New England States, excluding Maine ¹
	<i>Carloads</i>	<i>Carloads</i>		<i>Carloads</i>	<i>Carloads</i>
1922	10,989	12,868	1932	11,948	12,597
1923	9,370	10,217	1933	10,272	12,948
1924	14,082	12,968	1934	10,198	13,049
1925	13,271	11,804	1935	10,287	16,928
1926	14,315	9,474	1936	11,385	12,588
1927	16,888	11,091	1937	10,277	15,162
1928	16,145	9,331	1938	9,209	14,475
1929	12,699	9,354	1939	8,019	12,226
1930	17,979	8,760	1940	7,624	14,968
1931	15,874	12,630	1941		16,778

¹ Calculated at 667 bushels per car.

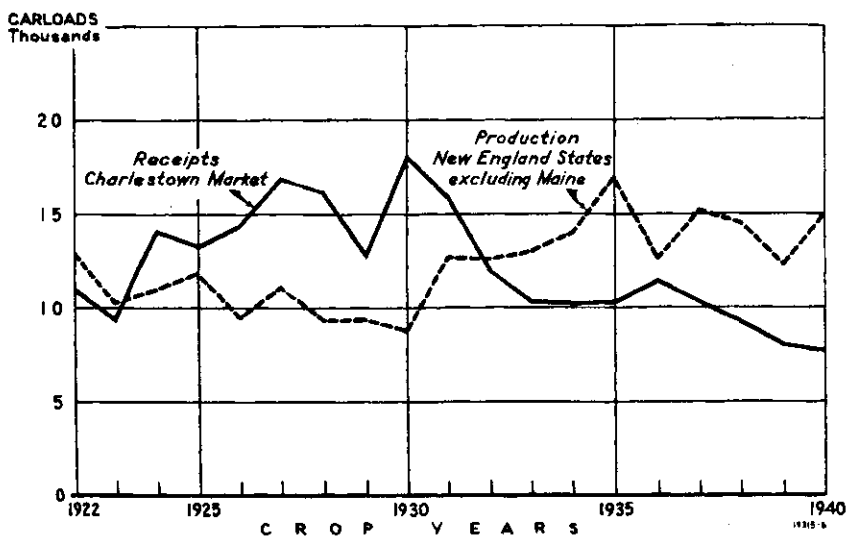
Sources: Carlot receipts at Charlestown Market are from Boston and Maine Railroad; Production in New England States for 1921-37 from U. S. Agricultural Marketing Service, Disposition of Potatoes, Crop Years 1909-37, issued September 1939; for 1938 from U. S. Agricultural Marketing Service, Agricultural Statistics; and for 1939-40 from U. S. Agricultural Marketing Service, Gen. Crop Report, December 1939.

FIGURE 9.—POTATOES: ACREAGE, YIELD, AND PRODUCTION IN AROOSTOOK COUNTY AS A PERCENTAGE OF THE AVERAGE FOR THE 11-YEAR PERIOD 1930-40.



Yields Fluctuated Irregularly Around Their Average Throughout This Period.

FIGURE 10.—POTATOES: CARLOADS RECEIVED AT CHARLESTOWN MARKET AND ESTIMATED CARLOADS PRODUCED IN NEW ENGLAND STATES, EXCLUDING MAINE, CROP YEARS 1922-40.



The Number of Carloads Handled Through This Market has Declined Since 1930.

related, declining carloads at Charlestown Market are partly to be explained by more direct shipments to the South from Maine, avoiding the use of the Charlestown Market where formerly many cars, later sent to southern destinations, were first received and then re-consigned. The increased nearby production, on the other hand, has displaced potatoes from areas other than Maine.

Changing Seasonals in Shipment to Market

Maine producers are generally of the opinion that the period within which they must market their potatoes has become shorter. They believe that the increased production of potatoes in the early crop States encroaches on their markets during the spring and limits their outlets at that time. They believe that an increased production in some of the more competitive late-crop States, or at least in certain sections of those late-crop States encroaches on the opening of their markets and limits the volume which can be sold early in the fall. Data, gathered through the Maine Federal-State Potato Inspection Service, on the shipment of carlots of potatoes out of Maine tend to bear out this conclusion. Table 12 shows that there has been a tendency for the proportion of shipments in August, September, and October to decline as well as for shipments from Maine during May and June to decline; whereas, the proportion of shipments from Maine during the winter and early spring have shown a tendency to increase. These are carlot shipments, however, with carlot equivalents for such truck shipments as have been reported. The data in table 12 are reproduced in figure 11 to show the change in the seasonal of marketing which occurred over the period since 1930.

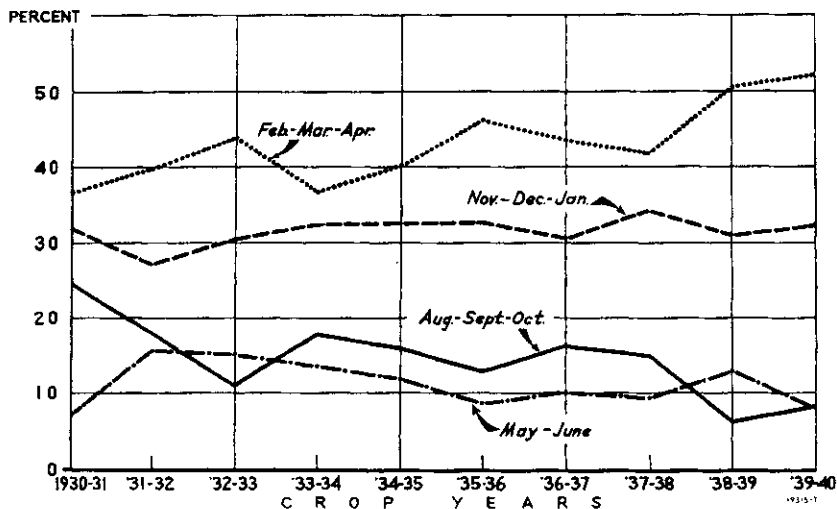
TABLE 12.—*Carlot shipments of Maine potatoes¹ for selected months, 1930-31 to 1939-40²*

Year	Carlot shipments					Percentage of yearly total				
	August, September, October	November, December, January	February, March, April	May, June	Total	August, September, October	November, December, January	February, March, April	May, June	Total
	<i>Carloads</i>	<i>Carloads</i>	<i>Carloads</i>	<i>Carloads</i>	<i>Carloads</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
1930-31	13, 074	16, 934	19, 527	3, 841	53, 376	24. 5	31. 7	36. 6	7. 2	100. 0
1931-32	9, 381	14, 270	20, 960	8, 186	52, 827	17. 8	27. 0	39. 7	15. 5	100. 0
1932-33	4, 751	13, 373	19, 236	6, 640	44, 010	10. 8	30. 4	43. 7	15. 1	100. 0
1933-34	8, 600	15, 737	17, 816	6, 516	48, 669	17. 7	32. 3	36. 6	13. 4	100. 0
1934-35	8, 487	17, 294	21, 367	6, 286	53, 434	15. 9	32. 4	40. 0	11. 7	100. 0
1935-36	5, 402	13, 668	19, 408	3, 595	42, 073	12. 8	32. 5	46. 1	8. 6	100. 0
1936-37	8, 019	15, 066	21, 533	4, 987	49, 605	16. 2	30. 4	43. 4	10. 0	100. 0
1937-38	7, 384	16, 918	20, 605	4, 650	49, 557	14. 9	34. 1	41. 6	9. 4	100. 0
1938-39	2, 406	12, 224	20, 026	5, 106	39, 762	6. 1	30. 7	50. 4	12. 8	100. 0
1939-40	2, 962	11, 916	19, 345	2, 944	37, 167	8. 0	32. 1	52. 0	7. 9	100. 0

¹ Including carlot equivalent of reported shipments by truck.

² July shipments not included.

FIGURE 11.—POTATOES: PERCENTAGE OF CROP IN CARLOT SHIPMENTS FROM MAINE IN SPECIFIED MONTHS, CROP YEARS 1930-31 TO 1939-40.



Proportion of Shipments in August, September, and October and in May and June Shows a Tendency to Decline.

This tendency toward declining shipments by rail and particularly at certain seasons of the year has been noted previously with reference to the movement of potatoes out of late-crop States. In a recent report on income parity for agriculture with reference to farm income from potatoes, dated March 1940,⁴ the following quotation appears:

Since 1929, available data indicate that the usual seasonal movement of potatoes by rail has been disturbed by the increasingly heavy movement of potatoes by motortruck, particularly during the fall months. This is particularly true in the late potato producing States, and has resulted in a sharply declining trend in the rail movement of potatoes during the early months of the marketing season and a relatively heavy movement during the later winter and spring months. However, considering total movement each month including rail, boat, and motortruck, it appears that there has been no marked shift in recent years in the proportion of sales before and after January 1.

There seems to be no reason for doubting these conclusions to the extent that they apply to areas where motortruck service is available. The growth of transportation by motortruck during recent years supports the conclusion. It also indicates that perhaps the services of delivery to buyers by motortruck are sufficiently important to make some of them purchase their supplies from areas in a position to provide motortruck transportation. The tendency to a changing seasonal for late-crop potatoes, however, can hardly be attributed entirely to recent years. In a publication on the Origin and Distribution of the

⁴ Income Parity for Agriculture, Part I, Farm Income, sec. 2. Income from Potatoes, 1910-38. U. S. Dept. Agr. Preliminary Report. 99 pp. 1940. (Processed.) (See p. 3.)

Commercial Potato Crop the same tendency to change in seasonal was noted.⁵ For instance, on page 23 of the publication cited is a comparison of the seasonal of shipments for the two years 1923-25 with the two years 1930-32. These show that for Maine the marketing period after January 1 was much more important in the latter than in the earlier period. A similar tendency was noted for Minnesota and North Dakota.

Potato producers in central Maine have trucking service available to them. Producers in Aroostook County, where by far the larger proportion of the crop is produced, have not until recently had this opportunity of sending potatoes to market. The proportion of the crop which is now hauled direct to market from Aroostook County by truck is very small and such truck movement as there is, is mostly to the ocean ports where it is fully accounted for in shipments by boat. Table 13 shows the percentage relationship between the estimated sales of potatoes from Maine and the reported shipments. This table shows that there was a decline in the relationship between reported shipments and estimated sales over the period of years presented and it was most important in the last two of them. In view of the fact that shipments from central Maine are included in this table the trend seems quite reasonable. It is equally reasonable to assume that the general opinion of shippers in Aroostook County is correct, since the truck shipments from that production area to outside of the State of Maine have been insignificant.

TABLE 13.—Potatoes: Estimated sales and reported shipments¹ from Maine, 1930-31 to 1939-40

Year	Estimated sales	Reported shipments ²	Reported shipments as a percentage of sales	Year	Estimated sales	Reported shipments ²	Reported shipments as a percentage of sales
	1,000 bushels	1,000 bushels	Percent		1,000 bushels	1,000 bushels	Percent
1930-31.....	38, 652	35, 602	92. 1	1935-36.....	32, 138	28, 063	87. 3
1931-32.....	40, 338	35, 236	87. 4	1936-37.....	38, 596	33, 086	85. 7
1932-33.....	33, 818	29, 355	86. 8	1937-38.....	40, 580	33, 054	81. 4
1933-34.....	35, 962	32, 462	90. 3	1938-39.....	33, 392	26, 521	97. 4
1934-35.....	44, 594	35, 640	79. 9	1939-40.....	32, 553	24, 790	76. 2

¹ July shipments not included.

² Calculated at 667 bushels per car.

Sources: Estimated sales for 1930-31 to 1937-38 are from U. S. Agricultural Marketing Service, Disposition of Potatoes, Crop Years 1909-37, issued September 1939; for 1938-39 to 1939-40 from U. S. Agricultural Marketing Service, Farm Production, Farm Disposition, and Value of Potatoes, Crop Years 1937-39, issued July 1940; Shipments are from U. S. Agricultural Marketing Service, Carlot Shipments of Fruits and Vegetables.

If the conclusion is valid that changing trends in carlot shipments are largely the result of increased transportation by trucks at certain seasons of the year, then it is equally valid to conclude that an area

⁵ Strowbridge, J. W. Origin and Distribution of the Commercial Potato Crop, U. S. Dept. Agr. Tech. Bul. 7, 63 pp. Rev. 1939.

in which the use of trucks was not important would experience a change in the seasonal trends because of the increased volume hauled to market by truck from other areas. Under these conditions the idea that the seasonal range of shipments has been narrowed for potato producers and shippers in Aroostook County is consistent with the conclusions of the income-parity committee for the Department of Agriculture. These conditions also account for the increasing proportion of shipments in midwinter. Either one or both of two procedures might lengthen this marketing period. The first of these is to develop a system of transportation by truck. If feasible this would be one way for Aroostook County producers to derive a competitive advantage or at least equalize a competitive disadvantage. The second conclusion is that a lengthening of the marketing season might be accomplished by adopting a merchandising policy which would increase the consumer demand for Maine potatoes to the extent that dealers might forego some of their advantages in purchasing by truck in favor of the opportunity to supply their customers with potatoes more carefully packaged and standardized for the customer's use. This last conclusion is drawn from data for the State of Idaho (table 14 and figure 12). For this State the trend seems to be just the opposite from that reported for Maine; namely, the proportion of shipments for the months prior to January 1 has increased rather than decreased and the proportion of shipments for the months following January 1 has decreased. In the markets of the eastern seaboard, for instance, Idaho potatoes enjoy a favorable reputation both because of their quality for baking and because of the care with which some of them are graded and packed. There is some evidence in these data that the potato growers of Idaho have been able to avoid part of the results of the competition between producing areas noted above.

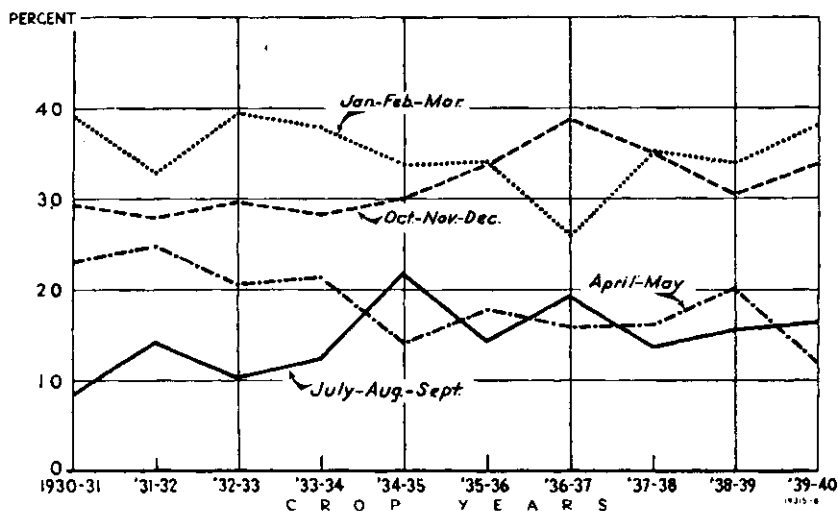
TABLE 14.—*Carlot shipments of Idaho potatoes¹ for selected months, 1930-31 to 1939-40²*

Year	Carlot shipments					Percentage of yearly total				
	July, August, September	October, November, December	January, February, March	April, May	Total	July, August, September	October, November, December	January, February, March	April, May	Total
	<i>Carloads</i>	<i>Carloads</i>	<i>Carloads</i>	<i>Carloads</i>	<i>Carloads</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
1930-31	2,786	9,581	12,800	7,566	32,733	8.5	29.3	39.1	23.1	100.0
1931-32	3,645	7,043	8,298	6,268	25,254	14.4	27.9	32.9	24.8	100.0
1932-33	2,292	6,644	8,797	4,808	22,341	10.3	29.7	39.4	20.6	100.0
1933-34	3,694	8,416	11,293	6,361	29,764	12.4	28.3	37.9	21.4	100.0
1934-35	5,762	7,892	8,886	3,719	26,259	21.9	30.1	33.8	14.2	100.0
1935-36	3,396	8,037	8,097	4,221	23,751	14.3	33.8	34.1	17.8	100.0
1936-37	5,435	10,952	7,338	4,470	28,195	19.3	38.8	26.0	15.9	100.0
1937-38	4,356	11,261	11,296	5,145	32,058	13.6	35.1	35.2	16.1	100.0
1938-39	5,198	10,140	11,289	6,717	33,344	15.6	30.4	33.9	20.1	100.0
1939-40	5,235	10,813	12,201	3,791	32,040	16.3	33.8	38.1	11.8	100.0

¹ Including carlot equivalent of reported shipments by truck.

² June shipments not included.

FIGURE 12.—POTATOES: PERCENTAGE OF CROP IN CARLOT SHIPMENTS FROM IDAHO IN SPECIFIED MONTHS, CROP YEARS 1930-31 TO 1939-40.



The Proportion of Shipments Prior to January 1 has Increased.

Consumption of Fruits and Vegetables

Available data indicate an increase in production of fresh and canned fruits sufficient to indicate an increase in the per capita consumption of both in the past 20 years as shown in table 15. For potatoes, a decreased production per capita indicates declining consumption. This is usually explained as the result of a shift in general consuming habits away from starchy foods. The shift, whatever its cause, may be of tremendous importance to potato growers, especially those of Aroostook County with few production alternatives. The increase in consumption of other fresh vegetables is less easily explained. By some authorities the trend in the data is partly explained as the result of a change to less production of these foods in home gardens, where they were not accounted for in the statistics of the industry, to greater reliance on the retail store as a source of supply. This would not in reality constitute an increase in use but rather a shift in source of supply.

The important fact from these data for the purpose at hand is the declining use of potatoes which, coupled with trends of increased production in some areas, amplifies the problem for others.

Because of the importance of these relationships to the further development of the potato industry, it is perhaps desirable, even at the cost of some repetition, to review some of the trends at this point. Figure 7 and table 7 showed that the trend of potato production over

TABLE 15.—*Estimated per capita consumption of fruits and vegetables, United States, 1919-20 to 1938-39*

Year	Fresh fruits	Canned fruits	Dried fruits	Potatoes	Fresh vegetables, including potatoes	Canned vegetables
	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
1919-20	118.8	11.0	7.0	133.0	263.7	14.0
1920-21	114.4	9.2	6.7	156.0	276.1	15.1
1921-22	98.3	7.4	5.4	135.4	239.5	10.5
1922-23	148.0	8.9	6.0	164.9	284.6	15.0
1923-24	144.1	9.1	5.6	149.9	276.0	16.3
1924-25	135.1	9.2	7.4	153.1	274.8	16.3
1925-26	134.8	11.6	5.8	123.1	241.3	21.5
1926-27	164.1	12.8	5.8	130.2	262.7	16.9
1927-28	118.7	12.8	6.0	146.4	274.7	17.2
1928-29	152.4	13.7	6.0	159.4	287.5	17.8
1929-30	123.6	12.3	5.3	129.6	261.4	21.2
1930-31	139.0	13.5	5.2	129.7	260.2	21.0
1931-32	152.4	11.0	5.1	140.4	270.0	16.2
1932-33	121.7	10.2	5.6	137.9	272.2	16.2
1933-34	119.6	11.9	5.4	124.9	269.5	16.4
1934-35	134.9	13.4	5.6	139.4	280.1	17.9
1935-36	145.4	13.8	6.1	136.8	282.7	23.2
1936-37	132.4	17.3	5.7	118.5	268.2	22.2
1937-38	178.4	16.7	6.1	137.8	296.1	24.0
1938-39	158.7	16.1	6.3	130.4	286.5	22.0

Source: U. S. Bur. Agr. Econ. Agricultural Statistics, 1940.

the past 20 years was slightly upward, although perhaps not definitely so since 1930. The population was increasing, but experts in this field hold that a continuation of this rate of increase is not to be expected and some even forecast important changes in this trend.⁶ The declining use of potatoes per person associated with these relationships between the trend in production and the trend of population increase is shown in table 15. These trends show that the fairly stable position of the potato industry in total acreage is maintained only because of an increasing population which is sufficient to offset the declining rate of use per capita.

In some areas production of potatoes increased whereas in others it declined. The reasons for these changes are important although not explained in detail here. If, for instance, a shift from production of potatoes to the production of another crop occurs because the other crop provides a more profitable use of production resources, the area may be assumed to have benefited because of the change. If, on the other hand, the shift occurred after competition forced returns for an area to a lower level, the area may be assumed to have passed through a period of depression halted by the opportunity to shift into another line of production. If under similar conditions an area has no important alternative, the depression period may become long and severe, causing abandonment of the less efficient farms and retirement of the less efficient producers.

⁶ Baker, O. E. A GRAPHIC SUMMARY OF PHYSICAL FEATURES AND LAND UTILIZATION IN THE UNITED STATES. U. S. Dept. Agr. Misc. Pub. 260, 57 pp. 1937. See p. 56; and Folsom, J. C., and Baker, O. E. A Graphic Summary of Farm Labor and Population. U. S. Dept. Agr. Misc. Pub. 265, 48 pp. 1937. See p. 45.

This type of competition is likely to be present in some form in the production and marketing of most crops. It seems likely to be intensified for the potato industry provided (a) the trend of increase in population is checked, and (b) the trend of declining per capita use is not checked. Acreage is then likely to be reduced on the least efficient farms and by the least efficient producers. The efficiency of production is, therefore, likely to be a decisive factor in the location of the area in which the impact of competition will be most severe.

Efficiency usually is measured in terms of market prices, and costs of all the services of marketing, as well as in costs of production. Efficiency in marketing, therefore, may be just as important as efficiency in production. It includes not only efficiency on the part of a producer in making his sales locally, but also the effectiveness of all the marketing intermediaries and facilities between the producer and the consumer.

The foregoing shows that potato growers in Aroostook County, Maine, are experiencing increased competition because of increased production in other areas. Lower prices without sufficiently lowered costs of production have added to the problems of some. They should therefore review the efficiency of their production and marketing practices. Since they produce a large volume of potatoes in a small area, some advantages might be expected to result from cooperative marketing on a scale large enough to gain for producers some of the advantages of low cost through cooperative handling of large volumes. The competitive aspects of the problem suggest the need for a merchandising program combining more direct routing from the producer to the retail store, better standardization of the product, and perhaps dealer service and advertising to introduce and extend the new program. The feasibility of these proposals will be examined further in later sections of this report.

EFFECT OF VARIATION IN SUPPLY UPON THE PRICE OF POTATOES

DIFFERENT food commodities vary with respect to the relationship between supply and price. It is important to know whether potatoes fall in the class in which a change in supply may be associated with a proportionately greater change in price, or whether a change in supply will cause relatively small change in price. If a decline in supply causes a proportionately greater increase in price, the producer is likely to receive more for a small crop than for a large one. Also, when an increase in supply causes a proportionately greater decline in price, the larger supply or the larger crop sells for less money than the small one. For a commodity in which changes in supply cause a relatively smaller proportion of change in price, the larger crop may

yield the larger income even though price declines when the crop is larger. It follows that for a crop in which an increase in supply causes a proportionately greater change in price, the diversion of surpluses away from the market has a very important bearing on the producers' income.

A crop in the marketing of which a change in supply is accompanied by a proportionately greater change in price is called a product with an inelastic demand, as opposed to a product which has an elastic demand.

In their present unorganized state producers of potatoes are not likely to organize for the control of supply in such a way as to raise prices to a point which would constitute a problem to the consumer. Production, however, varies widely from year to year as climatic and other factors change and the cost of potatoes to consumers fluctuates widely. In years of high prices producers market a larger proportion of the crop than in years of low prices, because in years of high prices potatoes which are damaged and small may have considerable market value which in other years would be lacking. In the years of high prices, therefore, consumers are likely to be less satisfied with potatoes they purchase because retail packages are likely to include more damaged and small-sized potatoes than in years of large supply and low prices. The conditions which cause short supply are likely to affect the supply through the yield. In other words, the size of potatoes in such years averages smaller. Potatoes that are very small are less satisfactory to consumers. The importance of this problem of satisfaction to consumers will be treated at greater length later.

Need for More Cooperative Action in Potato-Producing Areas

Wide variation in the production of potatoes from year to year, 419,000,000 bushels in the crop year of 1928 as compared with only 296,000,000 bushels in the crop year of 1925, makes organization for the handling of surpluses important for potato producers. This variability in production arises largely from variations in yields per acre. In 1928, for instance, 3,499,000 acres yielded over 427,000,000 bushels, some of which were not harvested because prices were so low. In 1933, 3,411,500 acres yielded only 342,000,000 bushels. This variability, or at least that part of it which rises out of variations in yield per acre, is not controllable by the producer and widely fluctuating volumes of potatoes produced and marketed are to be expected throughout the history of the industry unless organization is perfected for its stabilization.

In view of the occasional short crops the evidence hardly supports

the conclusion that the acreage is highly excessive. In a small crop year, for instance such as 1936 when only about 332,000,000 bushels were produced, the average price received by producers was \$1.12 per bushel. Such a price would ordinarily be highly satisfactory to the average producer but, when translated into terms of retail cost of food for the average consumer, might be burdensome and might be expected to hasten the trend toward consumption of other food products in competition with potatoes, a shift which would not be of benefit to producers of potatoes in any area.

The Relationship Between Supply and Price

A study of the variation in prices which is likely to result from variation in supply is, therefore, important as an indication of the extent to which producers might stabilize their income through market supplies.

Data published by the Department of Agriculture each year show the stock of potatoes on farms and in warehouses as of January 1. These data were compared with prices to farmers reported for the December 15 immediately preceding January 1 to find out what variations in price were likely to be associated with variations in supply. The data used for this purpose in table 16 covered the 20-year period from 1919 to 1939.

Price levels are usually partly associated with the amounts of money which the average consumer has to spend for the commodities purchased. Changes in the incomes of consumers, therefore, are likely also to be partly responsible for changes in price. In recognition of this fact, the index numbers of "Incomes of Industrial Workers" for the months of September, October, and November were combined to form a basis for comparing changes in incomes of consumers with changes in potato prices on December 15. The index for "Incomes of Industrial Workers" was selected because of the importance of potatoes to lower income urban consumers.

Throughout the problem as thus far discussed, the changes in supplies and the changes in prices have been considered in terms of percentage changes from year to year. The data, therefore, were converted to percentages. The prices for 1920, for instance, were stated as the percentages of the price for the same date in 1919. Stocks on farms and in warehouses for 1920 were also stated in terms of their percentage change from those of 1919. Within the accuracy of the data used, therefore, the problem is what percentage of change in prices is associated with a given percentage of change in potato stocks. Although it is recognized that factors other than the supply affect

prices, for the purpose of this study only the relationship between supplies and prices was used.⁷

TABLE 16.—*Index of stocks on farms and in warehouses January 1 and December farm price of potatoes in the United States, 1919-39*

Year	Stock on farm	Percentage	Price per	Percentage
	Jan. 1	of previous	bushel ¹	of previous
	1,000,000	Percent	Dollars	Percent
	bushels			
1919	85		1.03	
1920	63	74	1.59	154
1921	89	141	.99	62
1922	84	94	.94	95
1923	104	124	.46	49
1924	98	94	.70	152
1925	103	105	.51	73
1926	74	72	1.87	367
1927	80	108	1.25	67
1928	98	122	.81	65
1929	106	108	.46	57
1930	83	78	1.26	274
1931	88	106	.74	59
1932	108	123	.35	47
1933	109	101	.31	89
1934	98	90	.61	197
1935	124	127	.35	57
1936	106	85	.58	166
1937	85	80	1.01	174
1938	113	133	.42	42
1939	104	92	.55	131

¹ Based on Dec. 15 price of preceding year and Jan. 1 stocks in each State.

Source: U. S. Bur. Agr. Econ., *Income Parity for Agriculture, Part I, Farm Income*. March 1940.

The correlation between stocks available for sale and potato prices is shown graphically in figure 13.⁸ This very high relationship between changes in supplies and changes in prices, with prices varying proportionately much more than supplies, is representative of a commodity with a highly inelastic demand. It indicates that if potato producers in important marketing areas had strong cooperative organization, and used marketing quotas in selling their supplies, they could materially stabilize their net incomes. Acreage should be increased to a point where serious shortages should not be expected to occur even in years when production yields were low. Surpluses above the amounts likely to be required for direct human consumption would, therefore, be expected in most years. These surpluses would need to be diverted to byproduct uses, such as animal feed, starch, alcohol, or any other purposes which such cooperative organizations might find it feasible to provide. Stabilization of prices and farm incomes would result from the control of the mar-

⁷ For the purpose of straight line relationships for correlation, the percentages were first converted into logarithms. The logarithms were correlated and a regression coefficient calculated. The various points on the line of regression were converted back to percentages by the use of antilogarithms and the regression line in this form was charted in comparison with the percentage changes previously calculated.

⁸ Studies by the U. S. Department of Agriculture of the relationship between the volume of sales and income also indicate an inelastic demand. See *Income Parity for Agriculture, Pt. 1.—Farm Income, sec. 11, Income from Potatoes, Calendar Years 1910-38*. U. S. Dept. Agr. (Preliminary) 99 pp., processed. 1940. See p. 11.

ketable supply and, as indicated in figure 13, could be so controlled with relatively little effect from other factors usually important in the establishment of price levels. Complete stabilization, of course, is not intended, nor is it indicated in the data in figure 13. Prices in individual years indicate that income variations due to price changes not accounted for by changes in market supply would occur. In most years, however, the variation in prices from other sources would be relatively small.

Producers of potatoes, therefore, because of the peculiarity of their product which makes the demand inelastic, have at hand a tool for stabilizing their incomes. In some areas, however, they do not have cooperative marketing organization, and in other areas such organization is not strongly enough entrenched to accomplish the purposes described above. The lack of such organization makes an attempt at stabilizing incomes through the medium of supply impractical except to the extent that organization similarly effective may result through other means than that of voluntary cooperative marketing action.

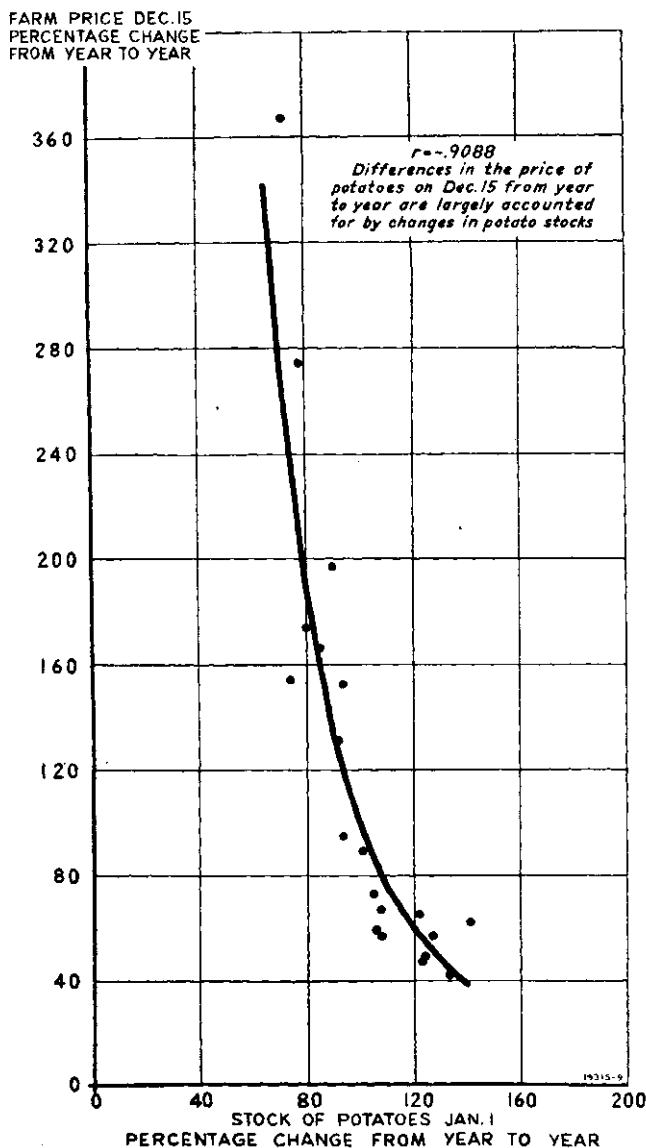
The fact that the potato industry is not represented by sufficient cooperative marketing organizations to accomplish an equitable adjustment of market supplies and prices as between the groups of producers and consumers is in itself a very strong argument in favor of more cooperative marketing activity among producers. A strong cooperative marketing association in any given area can sell freely in a year of low prices when many of its members, unaware of the compelling reasons for those low prices, might not elect to do so. Furthermore, producers operating singly can rarely accomplish the most effective marketing under circumstances in which supplies are excessive, because organization for distribution is necessary to sell at any given time with a minimum of discounting market prices.

An even stronger argument in favor of more cooperative activity lies in the fact that the major producing areas served by cooperative marketing organizations could be more effective in establishing industry policy through appropriate Government programs. Several such organizations, for instance, with wide membership in important producing areas might be able to bring about a system of control by quotas which would serve not only their own producers, but those of unorganized producers in less important producing areas.

Producers' organizations are likely to be more effective in accomplishing results such as those described above because producers are more interested in problems of price level. The private organization, by virtue of its method of operation, is able to be outstandingly successful if, because of a particularly efficient organization or market connection, it can consistently get the high price of the season, but the high price of the season may be so low as to bring bankruptcy to producers who are more interested in the much more important prob-

lem of a satisfactory level of prices. The producers' organization which interests itself only in marketing efficiency in getting the highest

FIGURE 13.—RELATIONSHIP BETWEEN PERCENTAGE CHANGE FROM YEAR TO YEAR IN STOCK OF POTATOES IN THE UNITED STATES ON JANUARY 1 AND PERCENTAGE CHANGE IN FARM PRICE ON DECEMBER 15 FOR 20 YEARS 1919-39.



Prices Varied Proportionately Much More Than Did Supplies.

price of the season is not sufficient for the purposes described. Some of the more fundamental purposes of producer cooperation must also

be adhered to in the operation of such a marketing association. The reasons for inelastic demand, for instance, need to be understood and, since they are not simple, the educational process by which they may be explained and their effectiveness brought into action needs to be planned.

Original and more fundamental principles of cooperative marketing include the idea of membership information and active participation of the members in formulating the programs and policies of a cooperative. If such fundamental principles are adhered to, a cooperative may be expected to take action of such a sort as occasionally to ignore the smaller immediate gains in marketing for those which promise more equitable returns over a longer time.

It is not meant to suggest that efficiency of operation and those connections in the market which make it possible to sell for the highest daily and seasonal price are not important to cooperative marketing associations. As a matter of fact, they are likely to be vital because they are the things which keep the organization operating from day to day. All that is meant from the foregoing discussion is to point out that the problems of marketing are not all day-to-day problems. The membership of a cooperative, or the membership of many cooperatives operating within an industry, may on occasion have tools at their hand which will make them and their industry more effective servants of the producers in general, but where such tools do lie at the producers' hands a responsibility to the consuming public is also likely to be imposed as a restraint.

The problem of surpluses in potato production is one which should be shared by all producing sections alike but particularly those producing areas in the intermediate and late crop States where marketing is more competitive in the fall and winter. In the absence of cooperative marketing organizations in many of the important producing areas, and lacking adequate procedure and equipment for the disposal of such surpluses, those producers served by cooperative organizations must treat the problem as purely competitive. Their approach to it is likely to be different from that which might be used under more cooperative conditions.

Recognition of the national characteristics of the problem has caused some attention to be directed toward its solution through a diversion of surpluses in some areas to the manufacture of starch. There is little doubt that this activity prevented prices from declining to a very low level in the crop year 1940-41 and may prove to be a very valuable device with which potato producers can remove parts of their surplus, provided the stocks of unconsumed starch do not become too large.⁹ Lacking a formula for adequate cooperation as to

⁹ The starch diversion program of the United States Department of Agriculture resulted in the conversion of more than 8 million bushels of potatoes from the 1940 crop into starch in 1940-41.

the control of surpluses between major producing areas, competition for markets on the part of those cooperatives as well as private marketing organizations, which are in some of the areas, is the natural result. Some of the steps usually taken in such competition are suggested as follows:

1. *Increased efficiency of production.*—Many cooperative marketing associations assist their producers to increase efficiency in production. When confined to one area, this increases the resistance of producers to generally lower prices. Such a procedure, however, does not solve surplus marketing problems because one of its results is likely to be increased production. Increased efficiency in production is a desirable objective because, for a time at least, there is a tendency for both producers and consumers to share in the gains.

2. *More efficient marketing on a cost basis.*—Competition between marketing agencies and reductions in cost of marketing are very likely to be generally beneficial because reductions in distribution costs are likely to help the producer and also strengthen the consumer's buying power. In general, the effects are likely to be similar to those of increased efficiency in production unless the advantages of low operating costs are restricted to relatively few marketing organizations.

3. *A struggle between marketing organizations to achieve advantages in the marketing of products.*—In this struggle the emphasis is likely to be first placed upon an attempt to increase prices by improving quality. The marketing organization attempts to place its product on a higher quality basis for the purpose of stimulating consumer demand and receiving higher prices. This emphasis on quality is likely to be the first step in an attempt at product differentiation designed to remove the product of one competing group from the general class of products. Further steps which may be taken in this same direction are the application of trade-marks and distinctive packages to the higher grades and the use of advertising. These activities can strengthen competitive position of the product of an organization or of a group of producers in their market. The fact that product differentiation, by the various steps indicated, and advertising will increase sales under some circumstances and benefit the interested producers has been frequently demonstrated. Whether the practice of using these procedures to strengthen the position of any selling organization in its market can be justified on social grounds is sometimes argued. There may be times when the net gain from such procedures is absorbed in an increased selling cost and there is no concrete advantage either to producers or consumers from the practice. To the group of producers, however, facing competition in the market, the question of social justification is of secondary importance. The competition itself may dictate the

method of meeting it. If producers of potatoes in one area pack their product to higher standards and use trade-marks, attractive packages, and advertising as competitive devices in selling, producers in other areas are likely to find it necessary to adopt all or a part of these same practices for the same purpose. If producers in one area, through better production practices or through decreased costs of transportation or some other device, strengthen their position in a market, producers in competing areas are likely to use such practices as are most likely to defend their position in that market.

In an area such as Aroostook County where so large a part of the cash income to farmers comes from the production and marketing of potatoes, the reaction to competition is likely to be even more complete. It is not surprising, therefore, that farmers resorted to legislative action on branding and advertising potatoes. The result of this activity also increased the interest in marketing research as a possibility of finding other marketing advantages.

The success in meeting the marketing problems of an area through the devices of product differentiation and advertising is likely to be greater under the direction of a cooperative marketing association because producers themselves are most interested in the industry problems of their area. If the solution of industry problems on a national basis can be attempted with a reasonable hope of success, the producers in such areas represented by their marketing association are likely to take an active part. Until such time competitive actions are likely to dominate the marketing processes with the members of cooperative marketing associations likely to be in a stronger position than they would be without such associations to represent them. When cooperative marketing associations do represent producers in most of the major producing areas, national problems can be met with more likelihood of success.

MARKETING POTATOES IN AROOSTOOK COUNTY

TO EVALUATE practices in marketing it is necessary to understand marketing methods and procedures. A description of markets, services, and dealers is, therefore, given here. This description should serve to help identify duplicated services or those of questionable value and thereby assist farmers in organizing their own marketing activities more efficiently.

A potato producer in Aroostook County has several ways of selling his crop, depending on his own financial status, the volume of his production, and the facilities which he commands for use in marketing.

The financing of the potato crop is expensive and the use of production credit is the rule rather than the exception. Those producers

who do not have a strong credit rating frequently find it necessary to contract for production credit on the basis of delivery of a specific portion of the crop (in kind) at the end of the marketing season. Credit advanced in this way may exceed the actual cost of producing the crop and include, in addition, the living expenses of the family and sometimes also the purchase of machinery and other equipment; and on occasion even the rental cost of the land is included in such an arrangement. Frequently also the financing of additional family conveniences is arranged in this way.

When such a method of financing is part of the growers' plan of operation, it becomes necessary for him to deliver a specified number of barrels of potatoes from his crop to the agency extending the financing. The marketing procedure for such a producer is determined largely by his credit arrangements, and usually the agency extending the credit is placed in the marketing business because the credit arrangement makes it the owner of potatoes for sale. Such agencies sometimes set up and operate their own warehousing facilities. Since they enter the marketing business involuntarily, they extend their marketing operations beyond that occasioned by the acceptance of potatoes in the discharge of a debt, and also buy and sell for more efficient use of their personnel and equipment.

The producer who does not have to deliver his crop (in kind), but discharges his production credit and other financial obligations in cash, has more choice in the means by which he disposes of his crop. Many of these growers are accurately described as producer-shippers. After growing the crop, they warehouse it in their own buildings constructed for this purpose or in rented warehouse space at some trackside. Such growers usually sell their potatoes through brokers and after sale pack, load, and ship them.

Maine Potato Growers, Inc., a cooperative, operates as a brokerage agency, receiving bids, matching them with members' offers to sell, and otherwise handling the selling problems of its members. This association renders services in addition to those which are usually provided by a brokerage agency in that it owns trade-marks and supervises grading and shipping of that part of the members' product which is sold under the trade-marks. It also does some cooperative buying of shipping materials, handles damage claims and collections for members, and provides financing of potatoes en route to market.

In addition to the brokers who arrange sales for producer-shippers, there are direct buyers operating in Aroostook County. These buyers usually own or lease warehousing space or, in some instances, they buy potatoes on track. As indicated above, the buyer may represent some agency advancing credit to producers. Some of the chain-store procurement organizations are also local buyers purchasing available potatoes outright.

Sometimes Maine potatoes are sold on the basis of joint-account relationships between a grower, or shipper, and a terminal market receiver. Where such a relationship exists, the producer or shipper usually ships the potatoes to the receiver. Frequently there is some sort of financial relationship between the producer and the receiver as the basis for this joint-account relationship, the receiver having advanced some of the production or marketing credit. The terms governing the operation of a joint-account relationship, however, are usually prearranged and vary considerably, depending on the contribution of the parties. The joint-account relationship has as its basis the idea of paying certain necessary costs of producing and marketing and dividing the profits or losses on some prearranged basis.

The usual practice in marketing Maine potatoes is to haul them to a trackside warehouse where they are graded and packaged for shipment. Potatoes are usually packed in 100-pound burlap bags or in retail packages of 10 or 15 pounds. These retail packages are especially constructed of strong paper which will stand up under considerable handling in shipment.

The grading process usually consists of two steps, the first of which is sizing, or the removal of potatoes considered too small for satisfactory sale. The second step is the removal of damaged tubers, considered undesirable for shipment. Sizing is accomplished almost entirely by machinery. Defective and damaged potatoes are removed by men who stand beside the sizing machine and pick them out by hand as they pass on an endless belt. Damaged and small potatoes are, therefore, a byproduct of the grading process. Sometimes they are discarded, but frequently they are diverted to uses, such as the feeding of livestock or the manufacture of starch.

In some instances, the proportion of small, damaged, or diseased potatoes in a lot may be so great as to discourage grading as U. S. No. 1, in which case the potatoes may be designated as of some lower grade and may be packed and sent to market for sale.

Costs of Selling, Loading, and Shipping Potatoes to Boston

Although there is some variation in the amount of potatoes loaded in a car, 40,000 pounds, or 400 bags of 100 pounds each, is usually considered the standard carload. Prices of the burlap bags used for containers for the potatoes vary considerably from year to year. For the purposes of this discussion, the price of 10 cents per bag for a new container was used, but in other years the prices of burlap bags may be found to vary several cents either above or below 10 cents. Paper containers used for packaging 10-pound bags were estimated to cost 1.6 cents each, or \$64 for a car of 4,000 packages. Fifteen-pound packages were estimated to cost 1.8 cents, or \$48.60 for a carload of

2,700 packages. Prices for paper containers also vary, depending on the grade of paper used and the volume of bags to be purchased. Quantity discounts were available to organizations buying considerable volume.

The labor cost of sorting, grading, and packaging potatoes was one of the larger costs in the marketing operations. It was estimated that four men could package and load a car of 100-pound bags in 1 day at a cost of \$16 to \$20 per car, or about 4 to 5 cents per 100 pounds. For packing and loading a car of peck packages, however, 7 men were required at a cost of about \$25 to \$30 per car, or approximately 1 cent per package. For 10-pound packages, the labor cost of sorting, grading, and packaging was estimated at \$30 per car, or about $\frac{1}{4}$ cent per package. When potatoes are not graded and sorted, the cost of loading a car is much reduced.

Usually potatoes are graded and packed at the shipping point. If the service is properly performed at this point later grading should, in most cases, be unnecessary. This is important to producers because grading requires rehandling and increases marketing costs. The most efficient practice should include adequate grading at the shipping point. If regrading at terminal markets is practiced it indicates that: (a) The lot was badly damaged in transit, (b) the lot was not properly graded at the shipping point, or (c) there were practices in the terminal market which duplicated services already performed and added to marketing costs.

When the services of brokers were used, brokerage costs sometimes amounted to \$20 per car. This cost varied considerably, depending upon the type of brokerage service provided and the particular arrangements between the shipper and the broker. Usually the brokerage fee was \$10 per car; and two brokerage fees were often required, one at the terminal market and one at the shipping point. Brokers, however, sometimes charge less than the full \$10 brokerage fee, depending on the services rendered and the volume handled.

In some instances, the shipper assumed some additional costs such as telephone and telegraph expense, and many shippers maintained an office and office equipment. It was estimated that selling costs amounted to as much as \$30 per car, which, of course, varied with the volume of potatoes sold and also with services rendered by hired selling agencies as compared with those rendered by the shippers themselves. Although \$30 per car was estimated as the average cost of selling potatoes, many shippers probably sold at a lower cost. At \$30 per car the selling cost is 7.5 cents for each 100-pound bag, three-fourths of a cent for each 10-pound bag, and approximately 1 cent for each peck bag.

A "reefer" charge of \$5 was made for the use of a refrigerator car. The car was preheated in cold weather, and in very cold weather

heat was provided to destination. The practice with respect to the use of heat to destination varies; shippers feel that potatoes shipped in a preheated car are likely to suffer damage in so small a proportion of the shipments that it is better for the shipper to avoid paying for heat to destination. The cost of heat to destination is \$6.35 per car; when cars are only preheated, the cost is less. In addition to the heating cost, the car is lined with paper for further protection against frost damage. The original cost of the car, plus heating to destination, plus lining, is estimated at \$12 per car, which amounts to 3 cents per 100 pounds, 0.3 cent for each 10-pound bag, and 0.44 cent for each peck.

In addition there were several miscellaneous costs such as power and light, warehouse costs, and depreciation of machinery, and supplies. These, of course, vary considerably between shippers and were arbitrarily estimated to average \$5 per car, which amounts to 1.25 cents per 100 pounds, 0.12 cent for each 10-pound package, and 0.19 cent per peck.

This review of the estimates of the usual cost of selling and shipping potatoes from Aroostook County was arrived at by consulting with various shippers and dealers. They were in close agreement with the estimates of costs published by the Maine Potato Growers and Shippers Committee. These costs, as they apply to the various sizes and packages, are summarized in table 17.

TABLE 17.—*Estimated expense of selling, packaging, and shipping a carload of potatoes from Presque Isle, Maine, to Boston, Mass.*

Expense classification	In 100-pound bags		In 10-pound bags		In 15-pound bags ¹	
	Cost per bag	Cost per car	Cost per bag	Cost per car	Cost per peck	Cost per car
Packing, shipping, and selling: ²						
Bags (new) ³	Cents 10.00	Dollars 40.00	Cents 1.60	Dollars 64.00	Cents 1.80	Dollars 48.00
Labor	4.00	16.00	.75	30.00	.93	25.20
Selling expense	7.50	30.00	.75	30.00	1.11	30.00
Car cost	3.00	12.00	.30	12.00	.44	12.00
Miscellaneous	1.25	5.00	.12	5.00	.19	5.00
Overage	.32	1.27	.32	12.70	.32	8.57
Total	26.07	104.27	3.84	153.70	4.79	129.37
Freight to Boston	37.00	148.00	3.70	148.00	5.50	148.00
Total expense	63.07	252.27	7.54	301.70	10.29	277.37

¹ Estimated at 2,700 pecks per car. This cost of packing and shipping 100-pound packages of potatoes to Boston in carlots, as estimated above, was 63.07 cents. The cost of shipping 100 pounds in peck packages was 68.5 cents, and in 10-pound packages it was 75.4 cents.

² Assembled from reports by the Maine Potato Growers and Shippers Committee.

³ Bag prices vary considerably from year to year.

When potatoes are graded before packing, the process yields some loss in small-sized and damaged potatoes as described above. This loss or shrinkage is assumed to be covered by the fact that the price of potatoes which have been graded is higher than that of ungraded pota-

atoes by an amount sufficient to pay for the cost of this loss and the cost of the grading operation. This type of shrinkage or loss is not charged to the cost of marketing. Packages, however, especially smaller retail packages, should contain full weight at the time of retail sale; therefore, they must contain some overage of weight when packed in order to take account of the fact that there will be shrinkage during the marketing process. This overage of weight is a cost of marketing, which increases on a carlot basis as the size of the package is reduced, because the greater the number of packages, the greater the number of overages which must be packed and the larger the amount of total overage per car. Overage was estimated at one-fourth of a pound per package. It amounted to 1,000 pounds for a car of 4,000 10-pound packages, 675 pounds on a car of 2,700 packs, and 100 pounds for a car of 400 100-pound bags.¹⁰ The cost of this overage was at the same rate as the cost of potatoes before packaging. For example, at \$2.10 per barrel it would be 1.27 cents per pound, and \$1.27 per car of 400 100-pound packages; \$12.70 per car of 10-pound bags, and \$8.57 per car of pecks.¹¹

To the cost of packing, selling, and shipping, as well as the cost of overage, there was added the freight cost of moving 100 pounds of potatoes in a standard carlot from Presque Isle, Maine, to Boston, 37 cents per 100 pounds.¹² This is \$148 per car of 40,000 pounds.

The estimated costs of selling, packaging, and shipping a carload of potatoes from trackside in Aroostook County to Boston are shown in table 17. On the basis of 100-pound burlap bags, they amounted to 63.07 cents; in peck packages, 68.5 cents per 100 pounds; and in 10-pound packages, 75.4 cents per 100 pounds. These are approximately the costs per 100 pounds which must be deducted from Boston wholesale market quotations to arrive at the price which the grower receives for potatoes delivered at a trackside warehouse in barrels and ungraded, using the Presque Isle freight rate. (Fig. 14.)

These costs of marketing potatoes are summarized in this form for a better understanding of the processes involved in selling. In addition, it should be observed that these were not the only costs of selling potatoes, for others occurred in the wholesale markets. The costs shown, however, were the most important, and of these cost classifications by far the largest item was for transportation. For shipment from other points in Maine transportation costs varied, and markets more distant from Boston carried higher transportation charges.

¹⁰ Overage of one-fourth of a pound, or 4 ounces, per package is estimated as a minimum figure. Some dealers use 6 ounces as an overage figure. The packing of this overage increases the total weight of the car and also may increase the freight cost of shipping.

¹¹ A barrel holds 165 pounds, or 11 pecks.

¹² Thirty-seven cents per 100 pounds was the minimum carlot rate in 1940.

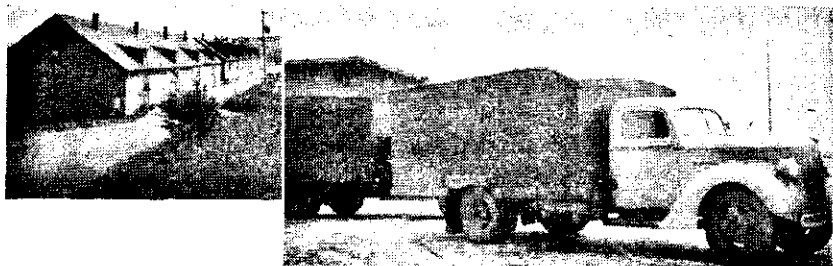


FIGURE 14.—(A) Trackage potato house in Aroostook County, where producers store their potatoes and pack them for shipment. (B) Potato truck. Enclosed bodies are used for hauling potatoes long distances in winter. Small stoves give additional protection against frost.

Shipping Potatoes to Market

Potatoes from Maine go to market by rail, by water through the port facilities at Searsport, Bucksport, and Winterport, by a combination of rail to Boston or New York and water for the remainder of the route to southern markets, and by truck.

Shipping Potatoes by Boat

During the 1939-40 marketing season the operations of the Atlantic Commission Company at Winterport made this the most important Maine market with water shipping facilities. Producers or truck drivers brought their potatoes to the Bucksport and Winterport markets and sold them outright. Facilities at Searsport, owned by the Bangor and Aroostook Railroad Co., handled only receipts by rail. Large warehouses are maintained at all three of these ports, where shiploads can be accumulated.

The recorded shipments of the 1939 crop of Maine potatoes amounted to 37,167 carloads.¹³ Shipments from Winterport and Bucksport amounted to 5.5 percent of this total. Searsport, formerly a very important factor in boat shipments, handled 356 cars or only about 1.0 percent. Twelve cars were shipped via St. John, New Brunswick, by boat. Figures for 1939-40 show shipments of 630 cars from Bucksport and 1,405 cars from Winterport, a total of 2,035 cars (table 18). Most of these shipments were concentrated at these ports by truck.

Insofar as Aroostook County was concerned, the itinerant trucker of the Boston market was not an important factor. A different type of truck-driver relationship was found there. Previously the Bangor & Aroostook Railroad hauled potatoes to Searsport where they were reshipped by boat to southern ports. Recent changes in freight rate

¹³ Federal-State Inspection and Marketing Service, Augusta, Maine.

structure have checked the routing of potatoes this way but during 1939 and 1940 other ports, particularly Winterport, were maintained for shipping potatoes out of Maine. Transportation to these ports was mostly by motortruck. During the wintertime many Maine producers found it desirable to haul potatoes to the ocean ports and thereby derive a small return for themselves. These truckers either handled their own crops or bought the potatoes from other Maine producers and resold them upon arrival at the ocean ports.

There has been considerable variation in the use of these ports and in the total volumes shipped by boat from year to year, as shown in table 18.

TABLE 18.—*Potato shipments from several Maine ports from 1933-34 to 1939-40*

Year	Carloads of 36,000 pounds shipped from				Total
	Winterport	Bucksport	Bangor	Searsport ¹	
	<i>Carloads</i>	<i>Carloads</i>	<i>Carloads</i>	<i>Carloads</i>	<i>Carloads</i>
1933-34		1,033		2,952	3,985
1934-35		2,159	59	6,850	9,068
1935-36		1,099		1,288	2,387
1936-37		979		630	1,609
1937-38		1,029	121	1,196	2,346
1938-39	1,189	1,468	104	649	3,410
1939-40	1,405	630		356	2,391

¹ Shipments via Searsport include cars loaded on Canadian Pacific and Bangor & Aroostook railroads. Shipments from Winterport, 1939-40, mostly assembled by truck, included 11 cars received by rail at Winterport station and trucked to the boat. Shipments from Searsport arrived at the port by rail.

Source: Boston and Maine Railroad.

One advantage of shipment by boat was the saving in freight cost. Another advantage sometimes claimed, for Maine farmers, was that the trucking of potatoes to the ports affords employment to many persons in the winter. This advantage may be real from the point of view of those persons in Maine able to avail themselves of it. Unless freight rates are sufficiently lower by boat to permit the inclusion of an adequate hauling charge in the delivered price, this advantage would be small.

As to disadvantages in shipping potatoes by boat, it was claimed that the unloading at the port, the transfer to the boat, the depth and weight of the stack in which the potatoes are piled in the hold, and the rehandling at time of unloading caused more damage than occurred when shipments were made by rail. This is perhaps a subject deserving further investigation, both to verify the validity of these claims and, if true, to develop means of handling to prevent the occurrence of excessive damage.

The destinations of boat shipments from Bucksport and Winterport during 1939-40 are shown in table 19. Boats from these ports stop at most of the important ocean ports along the Atlantic seaboard where potatoes were unloaded for further distribution.

TABLE 19.—*Destination and number of carloads of potatoes shipped by boat from Bucksport and Winterport, Maine, 1939-40*¹

Destination	Carloads	Destination	Carloads
Jacksonville, Fla.....	383	Miami, Fla.....	159
Tampa, Fla.....	22	Philadelphia, Pa.....	110
Savannah, Ga.....	192	Wilmington, Del.....	35
Norfolk, Va.....	736		
Baltimore, Md.....	200	Total.....	2,035
Richmond, Va.....	198		

¹ These potatoes were trucked to shipping points from producing areas, excepting 11 cars received by rail at Winterport.

Source: State and Federal Shipping Point Inspection Office, Caribou, Maine.

Carlot Receipts of Maine Potatoes in Boston

Boston received more carlots of the 1939 crop of Maine potatoes than any other market—partly for consumption in Boston and partly for redistribution. A total of 7,985 carlots of Maine potatoes was received in Boston from September 1939 to June 1940, inclusive. The rail receipts were 95.6 percent of the total, with reported truck receipts making up the remainder.

Supplies of potatoes from Massachusetts and Connecticut tended to retard the shipment of Maine potatoes to Boston in the fall. In the late spring, potatoes from the early-crop areas compete with Maine potatoes in the Boston market.

In table 20 the monthly rail and truck receipts of Maine potatoes at Boston for the 1939 crop are shown. March was the month having the heaviest rail receipts with 1,123 cars, or 14.7 percent of the total rail receipts for the season. April followed March very closely with 1,054, or 13.8 percent of the total rail receipts.

TABLE 20.—*Monthly carlot receipts of Maine potatoes at Boston by rail and reported receipts by truck, September 1939 to June 1940, inclusive*

Year and month	Rail		Truck		Total, rail and truck	
	Receipts	Percentage of total	Receipts	Percentage of total	Receipts	Percentage of total
	Carloads	Percent	Carloads	Percent	Carloads	Percent
1939						
September.....	528	6.9	35	10.0	563	7.1
October.....	636	8.3	31	8.8	667	8.4
November.....	710	9.3	17	4.8	727	9.1
December.....	588	7.7	31	8.8	619	7.8
1940						
January.....	883	11.6	30	8.6	913	11.4
February.....	895	11.7	40	11.4	935	11.7
March.....	1,123	14.7	61	17.4	1,184	14.8
April.....	1,054	13.8	40	11.4	1,094	13.7
May.....	950	12.5	44	12.5	994	12.4
June.....	267	3.5	22	6.3	289	3.6
Total.....	7,634	100.0	351	100.0	7,985	100.0

¹ Includes 2 carlots in July 1940.

Sources: Rail figures are from the Boston & Maine R. R. Co., and truck figures from the Agricultural Marketing Service.

Diversion and Reshipment of Potatoes

Potatoes for reshipment may be sent to Boston by rail and then reloaded from freight cars into boats. If the car is spotted at the wharf and unloaded directly by the steamship company, there is no additional transportation cost. If it is rerouted in transit or re-shipped after arriving at its destination, additional charges are made.

Most reshipments were trucked from the Charlestown Market to the boat rather than have the cars set at the wharf for unloading. The boat companies allowed the receivers 4 cents per 100 pounds, or \$16 per car, for trucking potatoes to the boat. By unloading the car at his own place of business and trucking to the boat, a dealer could gain employment for his trucking facilities and labor. Dealers estimated an addition to income from this practice and defended rehandling as necessary to discover damage in the lots which must be removed before reshipment.

Reshipping From Charlestown

By the end of June 1940, 2,801 cars of potatoes from the 1939 crop were reshipped from the Charlestown Market, as shown in table 21. Of this number, 686 cars were transferred from Charlestown to the Boston Market Terminal. Of the remainder, 1,185 cars were re-shipped by rail, and 930 cars by boat to destinations farther south. Reshipments are a large part of the volume of cars handled by some of the Charlestown wholesale receivers. Of 3,706 cars received by 6 receivers, 2,305, or 62.2 percent, were reshipped from Charlestown to other points.

Several Charlestown receivers operated in both the Charlestown Market and the Boston Market Terminal. As truck receipts were not permitted in either market, potatoes were moved from one market to the other mostly by rail. These reshipments were frequently from receipts at Charlestown, some of which may have been held there for repackaging and regrading. The reshipment charge was \$6.93 plus a \$10 unload charge at the Terminal, or in all about 4 cents per 100 pounds. This was less than standard trucking rates across town, but was said to be more than a receiver would charge for the use of his own truck if he were permitted to use it. In any case, it is a rehandling charge, part of which was necessary because of organization and practices in the Boston wholesale markets.

Table 21 shows reshipment figures for carlots of potatoes moved from the Charlestown Market for 6 years. In the first place, these figures show a tendency for the volume of reshipment from Boston to decline. Most of this decline in boat shipments occurred within the

TABLE 21.—Potatoes reshipped from Boston, 1934-35 to 1939-40

Season	By rail ¹		By boat		Total
	Shipments	Percentage of season total	Shipments	Percentage of season total	
	<i>Carloads</i>	<i>Percent</i>	<i>Carloads</i>	<i>Percent</i>	<i>Carloads</i>
1934-35.....	2,521	51.5	2,370	48.5	4,891
1935-36.....	3,000	63.2	1,746	36.8	4,746
1936-37.....	1,740	38.7	2,760	61.3	4,500
1937-38.....	1,087	30.2	2,507	69.8	3,594
1938-39.....	1,108	49.8	1,117	50.2	2,225
1939-40.....	1,871	66.8	930	33.2	2,801

¹ Includes cars transferred from Charlestown to Boston Market Terminal. The 1939-40 reshipments by rail were but 74.2 percent of the reshipments for 1934-35, and by boat the 1939-40 reshipments were but 39.2 percent of the number reshipped in 1934-35. This decrease in number of carloads reshipped by rail and by boat may be partly due to direct shipment from Maine.

Source: The Boston and Maine Railroad.

last 2 years. The greatest decline in rail reshipments occurred in the 1936-37 season, with some recovery in the 1939-40 season when reshipments by boat showed still further decline. These data also show a peculiar lack of consistency in the volume reshipped by the two different transportation routes. In the 1935-36 season, for instance, 63.2 percent of the reshipments were by rail and only 36.8 percent by boat, whereas in the following year only 38.7 percent were reshipped by rail and 61.3 percent by boat. During the 1939-40 season, only 33.2 percent of the reshipments were by boat, reflecting in part at least the effect of a downward adjustment in rail freight rates from Maine to southern points.

The general tendency for reshipment from Boston to decline partly reflects the fact that more and more Maine shippers have been making direct sales, thereby avoiding the wholesale receivers at the Charlestown markets. By so doing, they presumably save part of the cost of reconsigning or reshipping, as well as those parts of the Boston receivers' costs which are charged against such shipments. Shippers who have been able to make direct contacts at southern markets may have gained from this procedure. The cost of operating a wholesale receiver's place of business in the Boston market is still part of the cost of marketing potatoes for those not fortunate enough to have such direct contacts. If such costs have increased because of falling volume, and if they are in fact charged against the shipments of Maine potatoes which are handled by reshipment through the Boston market, or if in lieu of rising margins of cost, practices have been adopted which accomplish the same results by other means, some producers in Maine may either directly or indirectly have been penalized.

From September 1, 1939, to May 1, 1940, 1,746 diversions were reported.¹⁴ The diversions were heaviest during the first 4 months

¹⁴ Cars originally consigned to Boston but diverted, while en route, to other markets.

of 1940; March was highest with 345 cars. Diversions were heaviest to Florida, which received 377 carlots of potatoes by this type of shipment (table 22). Massachusetts points were next with 257 cars. Pennsylvania, Georgia, and New York City received 194, 179, and 159 cars, respectively.

TABLE 22.—*Monthly diversions of Maine potatoes from Boston, by destinations, Sept. 1, 1939, to May 1, 1940*

Final destination	1939				1940					Total
	Sep-tember	Octo-ber	No- vember	De- cember	Janu- ary	Febru- ary	March	April	May	
	Cars	Cars	Cars	Cars	Cars	Cars	Cars	Cars	Cars	Cars
Alabama				2	5	14	7			28
Connecticut	1	1	1	1	4	1	1	6		16
District of Columbia					1	2	3	2		8
Florida	44	62	48	75	60	31	29	27	1	377
Georgia	23	17	1	4	45	29	24	36		179
Louisiana		1	7	5	1		1			15
Maryland		1	3		5	2	12	1		24
Massachusetts	13	53	42	25	40	15	27	38	4	257
Michigan						1			1	2
New Hampshire	3	9	10	3	1	4	2	6		38
New York City		2	2		22	30	59	42	2	159
New York State		8	10	2	5	10	38	21	2	96
New Jersey		4		2	7	5	14	20		52
North Carolina						13	3			17
Ohio				1						1
Pennsylvania			3	25	39	23	50	48	6	194
Rhode Island			1	1	6	6	11	8		33
South Carolina	4	6	9	9	13	29	3	17		90
Tennessee						25	37	5		67
Texas					2					2
Vermont	1	1					2	1	1	6
Virginia							22	47	7	80
West Virginia					1	1		3		5
Total	89	165	137	155	257	245	345	329	24	1,746

Source: Boston & Maine R. R. Co.

Data showing diversions in table 22 and boat shipments in table 19 are particularly of interest as showing the wide distribution of markets in which Maine potatoes are sold.

Shipping Potatoes by Truck

Most of the shipment of Maine potatoes to market by truck is comprised of central Maine production hauled to Boston and adjacent markets by itinerant truckers or by commercial truckers who use potatoes for back haul. Some potatoes have been routed from origin in Aroostook County to Bangor as back haul for trucks loaded to Aroostook County, and such potatoes are sometimes reloaded into other trucks for transportation to Boston. In the 1939-40 marketing season, the equivalent of 351 carloads of potatoes was reported trucked into Boston.¹⁵ Additional volume was hauled into the markets adjacent to Boston where the receipts were not recorded.

¹⁵ Potatoes hauled out of Maine by truck but not delivered to one of the principal Boston markets are not included in this tabulation.

In 1940-41 some of the chain-store organizations experimented with the shipment of truckloads of potatoes from points in Aroostook County direct to supermarkets. This is an experimental procedure, however, the volume of which has not reached large proportions.

BOSTON POTATO MARKETS

THE organization of a market place including the location, the physical facilities available, the business organizations which operate there and their business practices, are of interest to producers of farm crops because they affect the total cost of marketing and, therefore, are likely to affect the producers' returns for his crops. If market places are widely distributed, for instance, and poorly located from the point of view of moving the products from one place to another, cost of marketing may be increased. In general, market places should be so located as to minimize the handling necessary in moving products from the producers to the consumers. Otherwise, cost of distribution and damage to perishable commodities are both likely to be increased. Congestion in market places also has an important bearing as it may cause unnecessary handling and damage, particularly to perishable commodities. Loss of time in handling too increases deterioration and marketing cost.

The location of markets can not well be considered separate from the facilities needed for marketing. These facilities are usually the stores, cold-storage warehouses, handling equipment, and transportation equipment, as well as the necessary streets and other highways. Too many buildings and other facilities lead to inefficiency in their use. Too few of them cause part of the crop to be improperly housed or processed, or roughly handled. For instance, when a product has to be moved from one wholesale market place to another within the city, as was frequently the case in Boston, the rehandling entails loss of time added expense, and increased likelihood of damage to the product.

Producers are also interested in the kind of competition in the market, because it affects not only the distribution practices but the marketing cost. It is important, for instance, to have enough competition to prevent the establishment of unnecessary services along the marketing channels. Competitive practices, however, may have an even broader implication. Some, as the practice of selling according to quality, the development of efficient marketing organization on the bases of cost and conservation of quality, are considered commendable. They promote equitable distribution, both of the product and of the returns from its sale. Other practices, such as those which unnecessarily increase cost or which

cause deception of either the producers or the consumers, are usually detrimental.

Producers should be just as interested in the organization of a central market through which their products are to be sold to consumers as in the organization of the local market nearer home. Conditions in these central markets usually have not been so carefully considered by producers because they are so far away that it is more difficult to do anything about them. Since producers are concerned with central markets, however, some of the potato-marketing problems which occur in Boston are discussed here.¹⁶

Some Requirements for a Good Terminal Market

One of the first requirements for a satisfactory terminal market place in Boston at which potatoes would be handled is facilities for all types of transportation. Since Boston is an important seaport, the market place probably should be located close enough to the steamship docks to encourage receipt and reshipment by boat. The long distances over which potatoes are transported make it necessary that adequate rail facilities also be present, including adequate interconnection services between the railroad lines. At certain seasons of the year, the market supply comes almost entirely from southern production areas, and in its transportation rail, truck, and boat facilities are used. Motortruck facilities should be included in the market both because of the problem of distribution in and around the city of Boston and because there are direct receipts by truck from central Maine and other nearby producing areas. An adequate market place should be equipped for the handling of products received by any of the various methods of transportation.

A satisfactory market place should be as near the center of population of the distribution area as possible, because this minimizes the cost of redistribution from the wholesale market place. In seaport markets such as Boston, however, the desirability of having the market place near the ocean port facilities would prevent its location near the center of population. The importance of location close to the center of population for redistribution purposes is, of course, minimized if adequate streets and highways are available for redistribution.

The market place should be open to all types of legitimate dealers who wish to operate there. It should include adequate warehouse and office space for the wholesale receivers who purchase large lots as well as for commission merchants who receive and rehandle the

¹⁶ For a more detailed description of the problem of establishing a satisfactory city market, see "The Wholesale Fruit and Vegetable Markets of New York City," a special report made by the Bureau of Agricultural Economics and the Agricultural Marketing Service of the U. S. Department of Agriculture covering the New York City markets.

product for their principals. Facilities should be provided also for retailers who come to the market to purchase. The potato market should be where a wide variety of other fruits and vegetables is for sale, as the retailer prefers to make as many of his purchases as possible at the same time and place.

In addition to the provision of adequate streets for transportation to and from the market and loading and unloading docks for the purpose of moving products into and out of the market, equipment should be provided for a farmers' market where producers might bring their supplies for sale to wholesale and retail dealers.

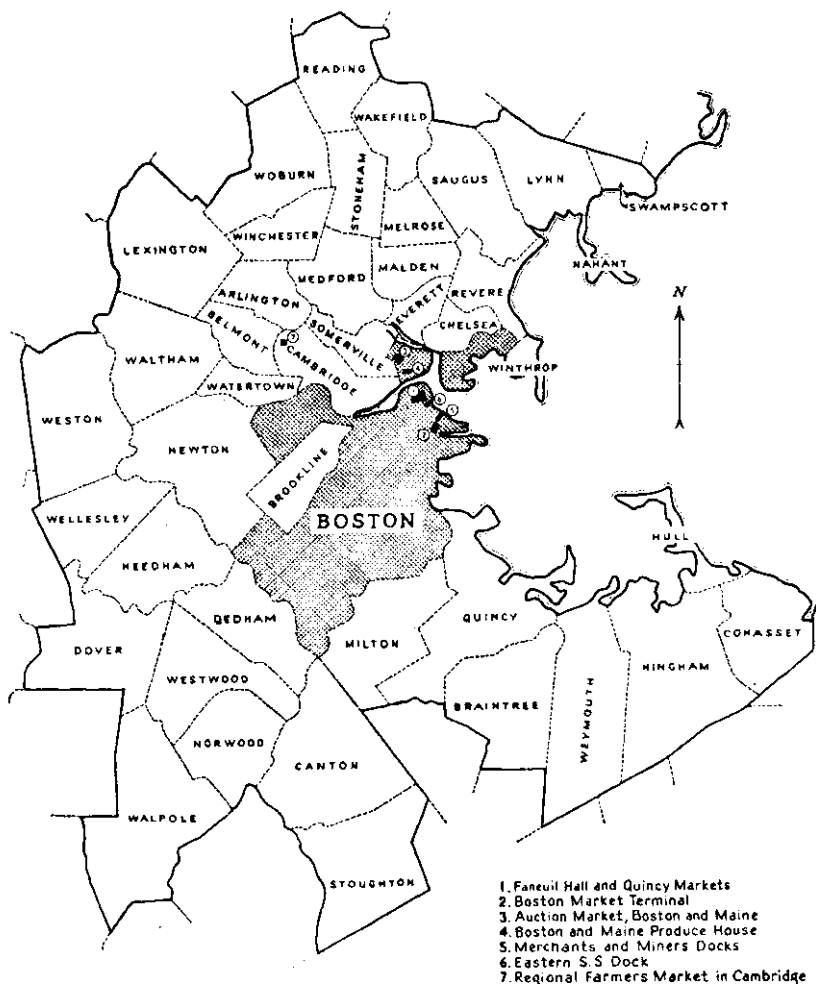
Whether a large consuming area should be served by one central market place or by a group of smaller subsidiary market places has been frequently discussed. One fact in favor of establishing several smaller markets is that local distribution costs are reduced if wholesale supplies are placed close to the retailer buyer. If the operation of several markets, however, entails the transportation of wholesale lots from one market to another, this increases rehandling cost and probability of damage to the product. More important probably is the fact that many buyers do not like to patronize a subsidiary market, as variety in both products and quality is likely to be greater at the larger market. The retailer is interested in the actual amount he must pay for a product as well as in the fact that his competitor is unable to buy at a lower price. Therefore, retailers are likely to patronize the larger market as the one at which prices are most likely to be determined and at which the larger number of competitors is likely to be buying.

Present locations of markets result from a variety of causes. In some instances, transportation agencies have established market places and facilities for services to the shippers who use their lines. Old and established market places are frequently maintained, even though the growth of consuming areas has indicated the desirability of a change, because the dealers who operate in the industry have made investments in facilities which would be lost or considerably depreciated by the removal of the market place. In addition, the cost of moving and reestablishing a market may be greater than private concerns may be expected to bear. The wholesale market place for a large consuming population, however, is a matter of public concern, and if increased efficiency is likely to result from abandonment of present location and reestablishment on a more desirable site, the gains may be sufficiently large to justify public expenditure for this purpose.

Potato Markets in Boston

Potatoes are assembled for local distribution at five places in the Boston metropolitan area, in addition to assembly points of the three

FIGURE 15.—WHOLESALE MARKETS FOR FRUITS AND VEGETABLES IN THE BOSTON METROPOLITAN DISTRICT.



Potatoes are Assembled for Distribution at Five Points Within the Metropolitan Area.

major retail food chains. The locations of these places within the consuming area are shown in figure 15.

The two most important wholesale market places for potatoes in Boston are the terminal of the Boston and Maine Railroad at Charlestown, known as the Charlestown Market; and the terminal of the New York, New Haven, and Hartford Railroad, known as the Boston Market Terminal. Late-crop potatoes, mostly from Maine, when received by rail usually arrive at the Charlestown Market. Early or intermediate-crop potatoes, when received by rail, are likely to arrive

at the Boston Market Terminal. Either market can be the destination of a carload of potatoes from the other areas, however, since the two terminals have rail connections.

Faneuil Hall and Quincy Markets (usually known as the Faneuil Hall Market) lie between the two railroad terminals. This is a farmers', jobbers', and retail market, but has no rail connections. Most of the Boston motortruck arrivals are unloaded here. (Fig. 16.)

The steamship docks are also important concentration points for incoming early-crop potatoes from the South and for outgoing late-crop potatoes, mostly from Maine, many of which are hauled by rail to Boston and reshipped by boat to southern points. Some seed and table-stock potatoes from Canada also arrive at these docks.

The Regional Farmers' Market in Cambridge serves as a wholesale market place for some nearby farmers who have potatoes to sell in the Boston metropolitan area.

Truckers distribute some potatoes in Boston. Part of their supply comes from the wholesale market places listed above. Some, however, come directly by truck from producing areas, both in Maine and in the nearby New England States. Truckers and hucksters are said to provide an important distribution service at certain seasons, selling to both retailers and consumers.

The Charlestown Potato Market

The Boston and Maine Railroad has provided terminal-market facilities, including sidings and potato warehouses, in the Charlestown district, a part of which is occupied by a group of wholesale potato receivers. (Fig. 17.) Carloads of potatoes arriving at this market are unloaded from the railroad siding directly into these warehouses,

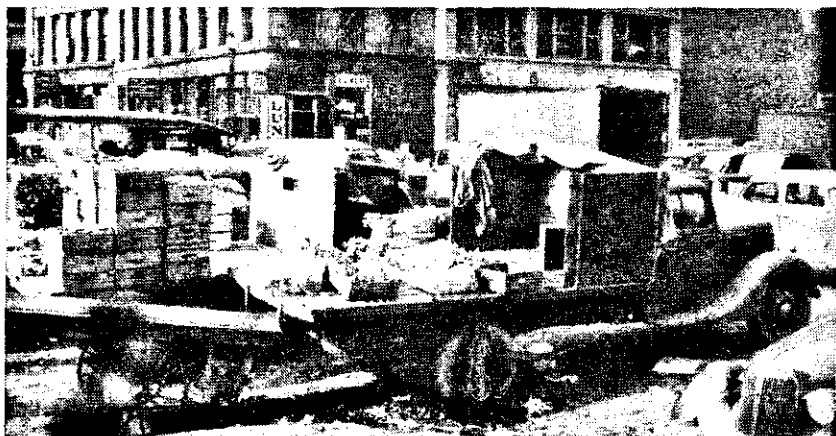


FIGURE 16.—Dealers operating in or near the Faneuil Hall Market have a serious traffic problem.

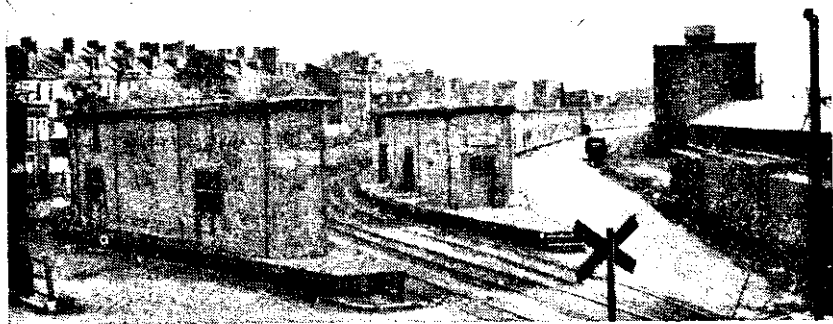


FIGURE 17.—The Charlestown Potato Market. Carloads are delivered at the rear of the stores where they are to be unloaded. Potatoes are hauled away from the front, mostly by truck.

and loaded into trucks from the opposite side of the same warehouses for redistribution. Dealers in the Charlestown Market specialize in potatoes, but dry onions, cabbages, and turnips are sometimes handled in smaller volumes. The high degree of specialization in the Charlestown Market has discouraged retailer patronage, and has caused some of the Charlestown dealers to operate stores in other Boston wholesale markets.

Some very important potato-marketing services are performed by the dealers in the Charlestown Market. These dealers are equipped with warehouse space for assembling stock, which is necessary to insure a regular market supply. They assemble carlots and resell, both in carlots and in job lots, to other Boston wholesale dealers. In addition, grading, sorting, reconditioning, and packaging services are sometimes performed by the Charlestown receivers. These services require warehouse facilities. When the potatoes are unloaded at Charlestown for rehandling, or merely for redistribution to other wholesale markets in Boston, extra handling is required, part of which could be avoided if the unloading and warehousing services were performed in a wholesale market with greater retailer patronage.

The Boston and Maine Railroad, in common with many other railroads, has attempted to restrict competition from trucks by prohibiting truckload arrivals at this market. The rule against truck receipts is difficult to enforce, but it probably serves to reduce the volume of truck receipts, because there is always the possibility that on arrival the trucks might not be permitted to unload.

The Boston Market Terminal

The terminal market facilities provided by the New York, New Haven and Hartford Railroad Co. are important as a market through which potatoes pass on the way to Boston consumers. Facilities owned

by the railroad company are leased to a corporation composed of wholesale fruit and vegetable dealers. Maine potatoes are delivered here by rail, directly from Maine shipping points and by reconsignment from the Charlestown Market. Because of the greater variety of fruits and vegetables sold at this market, its potential usefulness as a distribution point is perhaps greater than that of the Charlestown Market. It is also more conveniently located for supplying jobbers in eastern and southern sections of Boston, as well as the cities to the south.

The Boston Market Terminal, however, unlike the Charlestown Market, has no extensive potato-warehousing facilities and, therefore, is not adapted for the storage and handling operations carried on at Charlestown.

In addition, an attempt has been made to limit this market to wholesale functions by making the smallest unit of sale so large as to exclude most retailers. Furthermore, the New York, New Haven and Hartford Railroad, like the Boston and Maine, has refused to allow truck receipts.

Several of the dealers operating in the Charlestown Market have space in the Boston Market Terminal and thus increase their sales to the local trade. Operating in two locations, however, increases the cost of distribution as compared with a more centralized terminal where only one such distribution point would be required.

The Faneuil Hall Market

An important jobbing market is located in and around Faneuil Hall and Quincy Markets, which are owned by the city of Boston. Much of the property used for marketing purposes in the area adjacent to these two market places is privately owned. It is here that most of the truck receipts by wholesale dealers in Boston are unloaded. Dealers in this market draw on the other Boston wholesale markets as well as on nearby producers for supplies. The variety of products other than potatoes is greater here than in the Boston Market Terminal, including fruits and vegetables, meats, fish, and dairy and poultry products.

Besides the ordinary jobbing trade, there is a farmers' market where retailers and wholesale dealers purchase direct from producers. It is limited to use by Massachusetts farmers, and is active throughout the seasons when nearby farmers have produce to sell.

The Faneuil Hall and Quincy Markets have no rail facilities and are overcrowded, as indicated in figure 16. There is little opportunity to extend the market area except by the costly process of purchasing nearby properties and wrecking buildings for additional streets, parking spaces, warehouses, and stores. The lack of direct

rail and water facilities at these two markets does not lend support to such a procedure.

The Steamship Docks

At the docks boat shipments of late potatoes, mostly from Canada, and of early potatoes from southern ports are unloaded. Frequently large supplies are accumulated here for distribution in the Boston market area. Most of the arrivals at the docks are directed to individual wholesale dealers in Boston. The docks, therefore, are not so much a market place as a point in the process of transportation. Nevertheless, when accumulations are heavy, many lots are sold at the dock. The fact that arrivals at the Charlestown Market and the Boston Market Terminal are usually limited to those coming by rail causes some friction between the dealers, some of whom prefer at times to purchase at the docks and to use trucks for hauling the potatoes to their places of business.

Also many shipments of potatoes from Maine to southern ports are consigned by rail to Boston and reshipped from Boston to southern markets. These potatoes are usually hauled from the Charlestown Market to the docks by truck.

The Regional Farmers' Market

Within recent years a farmers' market has been operated in Cambridge. This market is owned by nearby producers of fruits and vegetables, but is not restricted to use by the owners. In season it becomes an outlet for nearby potatoes. During the fall of 1939, for instance, some southern New Hampshire farmers offered potatoes for sale here. The market has rail facilities, but trucks are the principal means of transportation. The busy season is during the summer and fall months.

When the Regional Farmers' Market was established, it was hoped that a sufficient number of dealers would make use of the facilities to create a year-round source of retail supplies, thereby relieving the congestion at the Faneuil Hall and Quincy markets. Development, however, has been very slow. Dealers have argued that the market was not centrally located and, therefore, could not expect to receive wide patronage. There are, nevertheless, large numbers of consumers in the adjacent suburbs of Boston who are supplied in part from this market.

Desirability of Reorganization

Boston has no central market adequate to serve at one time and place the needs of all kinds of dealers who might wish to operate there. The Faneuil Hall Market has become inadequate as to size and

facilities. In this respect, either the Boston Market Terminal or the Charlestown Market is probably better equipped. Warehouse space for potatoes and terminal service for farmers, truck drivers, and retailers have not been provided at the Boston Market Terminal, however, and the Charlestown Market is too highly specialized to be of service for general retail supplies. Augmenting the services of either of these markets would greatly increase its usefulness both to the city of Boston and to the producers and distributors engaged in marketing fresh fruits and vegetables. The possibility of this development operates as a check on the improvement of marketing facilities elsewhere.

Determination of the most desirable location for a wholesale produce market for Boston was not proposed as an objective of this study; neither could such a conclusion follow reasonably from a study of potato marketing alone.

Efficiency of terminal markets is important to the dealers who operate in them as well as to the producers and consumers who depend upon them. Judged by current standards, the study of the Boston markets might point to important gains from comprehensive market reorganization. Such a study, however, is seldom justified without strong support from interested groups inside the market area. Pending such further extension and information, it is important that the producers of potatoes in Maine recognize the problems of the Boston markets and conduct their own marketing activities in such a way as to avoid as many of them as possible.

TYPES OF DEALERS, COSTS, AND PRACTICES

THE ROUTES through which Maine potatoes reach the Boston market are described in connection with the operations of the various types of dealers. One important type of dealer, on a volume basis, is the retail food chain. Others are the Charlestown Market dealers, operating either as commission merchants or as wholesale receivers, brokers acting as marketing agents both in Maine and in Boston, and truckers and hucksters who are important seasonally. An understanding of these dealers and their places and practices in the distribution of potatoes is essential to an understanding of wholesale marketing.

Retail Chain Stores

Several retail chain-store systems in Boston sell potatoes. The smaller ones usually make their potato purchases from Boston wholesale dealers. The larger ones, however, purchase late-crop supplies in Maine and use the Boston wholesale market for buying when direct receipts are inadequate or for selling excess stocks.

The chain-store policy of making purchases in producer markets has reduced the volume of potatoes passing through the Charlestown Market. One chain-store organization is a part of a national system of stores that have a common buying agency. This agency is one of the largest buyers of Maine potatoes and operates warehouses at many of the shipping points throughout Aroostook County. The chain's supply for Boston is ordered from this agency. Another chain-store organization operating primarily in Boston and vicinity also maintains warehouses in Maine for buying potatoes. A third chain does not operate facilities in Maine but sets up quality requirements for its brands and buys part of its supplies from packers and shippers of potatoes in Maine, and the remainder from wholesale receivers in Boston.

The chain stores do not maintain large supplies of potatoes in Boston, probably because of the cost of storage and risk of loss through deterioration. They gear their procurement operations as closely as possible to sales, preferring on occasion to use the local wholesale market as a source of temporary supply. To the extent that carlot arrivals can be unloaded directly into trucks and routed to the store units, handling and storage costs are reduced.

The Charlestown Market Receivers

The volume handled through the Charlestown Market was formerly a much larger percentage of total sales of Maine potatoes in Boston than at present. The policy of the chain stores in purchasing potatoes direct from Maine has reduced the volume of business at this market. Rail shipments to other areas reconsigned from Boston still constitute an important percentage of the Boston receipts and these usually are handled by Charlestown Market dealers. An increasing volume of direct sales, avoiding the use of Charlestown Market or its dealers' services, is reported, further reducing the volume of business handled there.

Some potatoes are handled by the wholesale receivers in Charlestown Market on a commission basis. Commission sales of potatoes usually are heaviest in the early fall months when supplies are largest. They are also likely to be heavier in years of large crops.

The decline in volume of commission business was probably the direct result of the decline in total volume of potato sales handled in the Charlestown Market. Dealers must have an adequate volume of business to maintain low unit operating costs. With the total volume passing through the market reduced by diverting potatoes through other marketing channels, dealers in the Charlestown Market could not depend on the volume of consignments to maintain their individual operating efficiency and were forced to resort more to outright purchases.

Some wholesale receivers maintain warehouses and purchasing representatives in Maine. Others establish direct contact with carlot shippers. Such relationships between buyers and sellers may extend over many years, depending on mutual satisfaction with the services rendered.

The wholesale receivers in the Charlestown Market lease their space from the railroad company. Rentals are calculated on the basis of \$500 a year for each door unit; that is, space with one door on the track where cars are spotted and one door on the street where trucks are loaded (figure 17).

Wholesalers at this market perform many jobbing functions such as selling small lots, and processing and packaging for retailers. Some retailer patronage (including chain stores, hotels, and restaurants, and some independent retail grocers) comes direct to the Charlestown Market. Deliveries are made, and to some extent credit is extended to small dealers and retailers. Some wholesalers maintain trucks, while others operate on a cash-and-carry basis. Others hire trucking service when needed.

Cars unloaded in Boston for local distribution may be rehandled by the Charlestown Market receivers, as follows:

1. They may be sorted to remove excess rot and damage.
2. They may be sorted to comply with size requirements of buyers.
3. They may be repacked in peck packages.
4. They may be repacked in 100-pound bags with different brand and grade terminology.
5. They may be mixed, usually for the purpose of meeting competitive prices
6. They may be resold in original packages without any rehandling.

The costs of handling potatoes in the Charlestown Market depend on the extent and the kind of rehandling necessary. If passed through the dealer's place of business without grading or repacking, the costs may be as low as \$20 per car. If repacked in pecks, the costs may amount to upwards of \$50 per car or even to \$80 or more if package costs are included.

Several Boston receivers in the Charlestown Market unload 100-pound sacks of potatoes and repackage them in pecks. Some of these peck packages are reloaded and reshipped to the Boston Market Terminal or to the Faneuil Hall Market and sold to retailers and jobbers there.

Commission Merchants and Brokers

As indicated above, most of the Maine potatoes received in the Boston Market are purchased outright by the wholesalers and dealers who operate there. Some potatoes, however, are handled by these receivers on a commission basis. In this case the dealer does not own the potatoes but handles them for the account of the shipper and

charges the shipper for marketing services. The commission merchant may recondition, repack, or reship the potatoes, just as he would do if they were his own property. He does not own them, however, and performs his services at the direction and cost of the shipper.

Brokers are found in both the producers' and the wholesale markets. They serve as intermediaries only, since the broker neither owns nor handles the potatoes. The principal service of the broker in the marketing of potatoes lies in the fact that he has a wide acquaintanceship among both buyers and sellers. He receives bids from prospective buyers and offers from prospective sellers, bringing the buyer and seller together. In some instances, brokers may be more interested than merely in bringing the buyer and seller together. For example, the buyer may ask the broker to report on the quality of the potatoes offered for sale. He may even ask him to supervise the loading or to handle some financing arrangement.

Hucksters and Truckers

Hucksters and independent motortruck operators have a place in the marketing of potatoes in Boston. As transportation agents they haul a considerable volume of potatoes, mostly from central Maine, the Connecticut Valley, nearby Massachusetts, and other producing areas. As dealers, they buy potatoes from producers and sell them to the wholesale and retail dealers. There is some indication that this business with retail stores is looked for by the truck drivers hauling potatoes on their own account because they are denied the use of some of the wholesale markets in Boston. A tendency for independent truck drivers and hucksters to do business with retailers, however, has been noted in many other markets and is not peculiar to Boston.

Activity on the part of these dealers is most important in the fall when the crops from the nearby production areas are being sent to market. The fact that some producers in the Connecticut Valley and nearby Massachusetts do not have storage space available in which to hold the crop for later marketing probably gives these itinerant dealers a better opportunity to trade with this part of the Boston potato supply. It is reported, however, that potato producers in these States are providing permanent storage in order to strengthen their position by holding part of their supplies off the markets until later in the season.

Free Time and Demurrage at Boston Markets

Receivers at the Charlestown Market usually are notified of the arrival of cars at approximately 9 a. m. each day. At 4 p. m. daily each receiver submits a form which advises the railroad company to

withdraw empty cars and those loaded for reshipment, and where to set new arrivals for unloading. Cars are set at the warehouse door specified by the receiver, as well as on the track specified for unloading. At the time of notification of arrival, the receiver may inspect the car before it is set for unloading, provided the bill of lading permits.

The receiver is entitled to one setting of the car for unloading in the Charlestown Market, the Boston Market Terminal, at the steamship wharf, or anywhere else within the Boston switching area. All other moves after the original setting are done at a charge of \$6.93 per car, or at a switching charge depending upon the nature of the movement.

Forty-eight hours' free time is allowed the receiver following notification of a carlot arrival billed to him, after which demurrage is charged by the railroad. The 48-hour period begins at 7 a. m., following notification of the arrival. The free period is calculated only on the basis of working days.

Fifteen days of free time are allowed for a carlot of potatoes in Boston provided the shipment originated outside the Boston area and is for delivery to a steamship company. If the carlot of potatoes originates within the Boston switching limits, 5 days of free time are allowed on boat consignments. The increased free time on waterborne freight at Boston permits the accumulation of water freight tonnage.

Demurrage accounts are operated between the railroad and the receivers on an average agreement plan. This plan gives the receiver credit for all cars unloaded within the free period, as well as charging his account with the number of days in which the demurrage was incurred. If at the end of each month the credits established under this plan exceed the number of days of demurrage incurred, no demurrage is charged. These accounts are operated on a monthly basis and are settled monthly. No accumulation of credits is permitted from month to month. This plan helps the wholesale receivers by reducing the costs of demurrage.

Demurrage charges are assessed at the rate of \$2.20 per day for the first 4 days and \$5.50 per day thereafter. Demurrage is based on continuous time; Sundays and holidays are not excepted, as in calculating free time.

Some Costs of Operation in the Charlestown Produce Market

Opinions differ among the Charlestown wholesale receivers, relative to costs of the various services performed. Costs may vary with the ability of a receiver to direct his own operations. This study did not

include a detailed examination of the individual records. Some of the common cost elements are discussed on the basis of some operating statements and the opinions of various receivers.

Union wages are paid to the potato handlers in the Charlestown Market based on an agreement made during the fall of each year. The union rate during 1939-40 was \$6 per day per man if hired on a daily basis, or \$5 per day if hired on a weekly basis. If a man were called to work for a half day or less, he received a half day's pay, or \$3. Added wages at overtime rates were paid for overtime work. Five men made up a crew. This number is more or less fixed by the union agreement. In hiring crews, a receiver must have packaging, sorting, or grading to do; otherwise, there is little need for so many men. A few receivers use crews regularly, others use them only rarely.

Cars of potatoes received at the Charlestown Market have to be unloaded into dealers' warehouses. These potatoes may be received in bulk, packaged in 100-pound burlap bags, or in retail packages of a peck or less. The practice of shipping potatoes in bulk has been almost entirely discontinued in recent years. One man can unload a car of 400 bags in about one-half day at a cost to the receiver of \$3, or approximately three-fourths of a cent per 100 pounds. The same man can unload a carload of 2,700 peck packages in about the same time at a cost to the receiver of \$3, or approximately one-ninth of a cent per peck. These operations include only removal of the load from the car and stacking in the receiver's warehouse. On occasion, when the entire carload is removed directly by truck, the bags may be moved through the warehouse and into the trucks at about the same cost for labor.

Sometimes carlots of potatoes in 100-pound packages are transferred from the original bag to another. This operation requires more labor because the potatoes have to be emptied out on the floor and repacked in new bags. It is estimated that this operation requires a crew of 5 men for about one-half day. Dealers estimate this labor cost at \$15 per car, or about 4 cents per 100 pounds. The labor cost of unloading a car of 400 of these 100-pound bags, reconditioning, repacking, and reloading them into another car varies from \$15 to \$30, depending upon the amount of reconditioning that is performed. It is frequently necessary to incur this cost because potatoes arriving at the market are poorly sized or include damage of various kinds which must be removed before the car can be reshipped to some other location in Boston or to some other market.

The labor cost of performing a similar operation, but repacking the potatoes into peck packages, is somewhat greater because of the greater number of packages to be handled. Nevertheless, for practical purposes the dealers estimate that this operation also can be completed

with a 6-man crew operating for 1 day at a cost of approximately \$36 per car, or about $1\frac{1}{2}$ cents per peck. In most warehouses machine equipment for packing retail packages is used.

The cost of repacking in peck bags, as estimated above, does not include the cost of the package and ties, which is estimated at approximately 2 cents per peck. The quality of the paper used in the manufacture of these bags affects the cost, as also does the number of bags purchased by the packer, since quantity discounts are usually given on larger purchases. Against this additional cost of new bags, however, is the reclamation value of the buriap sacks.

Some dealers estimate the cost of labor, bags, and ties at 3 cents per peck or \$81 per car of 2,700 pecks. This does not include overhead expense but merely the expense of converting a carload of 100-pound sacks of potatoes into peck packages.

The cost of operating the establishment of a wholesale receiver at Charlestown depends very much on the types of operations which are performed. Those dealers who merely receive carlots and reship or sell them without additional handling are able to operate on a much lower cost per 100 pounds or per car of potatoes handled than those who do considerable rehandling.

Hired trucking usually costs 5 to 7 cents per 100 pounds, depending upon distance. One receiver pays 10 cents per 100 pounds for service to the outlying areas on shipments of ten 100-pound sacks.

Each receiver has office help of at least one person, as well as one full-time warehouseman. For the average receiver, this full-time employee can unload most of the cars and sell at the warehouse. If deliveries must be made, the additional expense of trucks or trucking is added.

Costs Related to Volume

Volume of business is an important cost factor in the operations of a potato receiver at the Charlestown Market. During the 1939-40 season, 7,624 carloads of potatoes were handled through this market by 16 receivers, an average of 476 cars per receiver. Some receivers handled a much larger volume, however, and 6 of the largest handled more than half the total. This wide variation in volume and in the individual operations of the 16 receivers limits the usefulness of any cost data which might be available. Comparison of two of them, however, showed that one receiver who handled slightly more than 100 cars per year had management expense of only \$2,500 but a cost per car of more than \$100. The other handled more than 1,000 cars; the manager's salary was over \$5,000, and the cost per car was about \$22. These are extremes in costs but the two receivers conducted business of about the same type and the difference in cost was mostly due to difference in volume.

It may be true that, if the volume of a business is slowly decreasing, the retrenchment which should accompany such a recession of volume does not always occur as promptly as corresponding changes when volume is increasing. This is particularly important to Maine producers as the volume of business flowing through the Charlestown Market declines. A group of cooperating producers can assure their marketing organization of a volume adequate for economical operation and avoid high costs from this source.

The minimum expense of operating a potato store in the Charlestown Market is likely to be \$10,000 or more annually, depending on the type of operations performed and the amount of salary withdrawn for management. Rent for a 2-door unit (2 doors on the track and 2 on the street) is \$1,000 per year. An office clerk is necessary, at an estimated minimum salary of \$1,200 per year. Some dealers have additional office help. Buying and selling expense, including telephone, telegraph, and travel, is estimated at a minimum of \$500 per year although the dealers with large volume find it necessary to spend much more. Bond and interest expense is likely to amount to \$500 per year, and other miscellaneous expense is estimated at an equal amount, making a total of about \$3,700 for rent and administrative expense without withdrawal for management.

It is necessary that a warehouseman be hired at a minimum union wage which would be about \$1,600 per year. The warehouseman handles small volumes of business alone, but in busy seasons needs a helper for which \$800 per year has been estimated. If store operations include repackaging, crews must be hired; but additional warehouse labor used only on occasion has been omitted from this estimate as applying only to particular lots of product or to more specialized operations. Truck service is usually necessary. If hired, it is paid for as used. Some dealers maintain their own trucks at considerable variation in annual cost, depending on the kind of truck used. Interest and depreciation on a truck have been estimated at \$400 per year. A truck driver hired at the union rate of \$40 per week at full time would cost over \$2,000 per year. Since they are not always hired for full time, a truck driver's salary of only \$1,000 per year has been estimated. The cost of a warehouseman, truck and truck driver, and helper is estimated at a minimum of \$3,800 per year. A larger outlay for these purposes would be more likely.

If, in addition to the above, the manager or owner withdrew \$2,500 per year in salary—larger withdrawals for this purpose were actually reported by 3 of the 4 dealers from whom cost figures were obtained—the total estimated annual cost would amount to \$10,000.

If the total cost of operating a place of business were \$10,000 per year, 400 cars would be necessary to hold costs as low as \$25 per car, about \$3 per car higher than that reported by 1 receiver. At \$12,000

per year, 480 cars would be required. Since the costs here estimated are minimum costs, it seems that an organization operating in this market should plan on a minimum volume of 500 cars per year, provided the services rendered by it were essentially the same as those now performed by Charlestown Market potato dealers. Operations such as reconditioning or repacking make the expense per car for a wholesale receiver in Charlestown higher.

Some Reasons for Packaging in Boston

Since packaging costs in Maine are probably less than in Boston, packaging, sorting, and grading insofar as possible should be completed in Maine.¹⁷ Some receivers, however, package a considerable volume of potatoes in Boston.

A local receiver, for example, bought a carload of Maine Utility grade potatoes at \$1.55 per 100 pounds. The potatoes without the burlap bag represented a price of \$1.52 per 100 pounds. These potatoes were packaged in peck bags at an estimated cost of 3 cents per peck for 2,700 pecks. The 2,700 pecks represented an investment of approximately \$689 (\$608 stock plus \$81 labor and bags) or about 25.5 cents per peck.

These pecks were sold in the Boston Market Terminal for 29 cents each, or at the rate of \$1.96 per 100 pounds and \$783 for the carload. The local dealer, after paying packaging costs, received a margin of approximately 23.5 cents per 100 pounds. The receiver agreed that, if he had retained the potatoes in 100-pound sacks, his margin would have been substantially less.

The potatoes were placed in a peck bag under a trade brand used generally about the market. The Utility grade and packer's name were stamped on the bag. The evidence here is that potatoes of low grade have frequently been sold, if packed in retail packages, at prices which yield a greater margin than when sold to more discriminating wholesale buyers in 100-pound bags.

Such operations partly explain why dealers prefer to have potatoes in 100-pound sacks in Boston. In some cases mixing operations may make potatoes of unsatisfactory quality or size more easily salable. In other instances markings on packages required by the State of Maine for dealer or consumer protection may be unsatisfactory to Boston wholesale receivers, in which cases potatoes may be repackaged.¹⁸

Some receivers insist that they cannot take the chance of permitting Maine shippers to select the quality they wish placed in their packages

¹⁷ Potatoes have to be packed for shipment. Packing in Boston requires opening of original package and repacking.

¹⁸ Paper tags of various colors attached to sacks to indicate grades are removed by dealers whenever desirable.

under their own brands. To protect and control this quality, they do their own packing.

In years when there are wide price differentials between wholesale prices for potatoes of various grades and varieties, repacking in Boston becomes more profitable than in years when prices are lower and margins narrower.

Some Packaging Practices

The proportion of the potato crop falling in the various grades depends largely on production factors. In 1939, for instance, a drought occurred in the latter part of the growing season, as a result of which the individual potatoes were characteristically small in size. This considerably increased the proportion that was too small to grade U. S. No. 1. Conditions such as these raise a serious question as to what should be done with the small potatoes. Frequently it is recommended that these potatoes be withheld from consumption altogether. Another suggestion is that, since all potatoes are likely to have some value at the market, the problem is not one of withholding the least desirable, but rather one of adequately identifying them for the consumers' protection so that a closer relationship between price and quality may be developed. Undoubtedly some shippers and dealers include in their selling policy one or the other of these proposals. Nevertheless, it is equally certain that some dealers follow a third practice which is either mixing sizes and qualities, and making the better potatoes carry as many as possible of smaller size, or inferior quality, through the market; or repacking lots in 100-pound or in peck-sized packages, and changing or removing grade names for the same purpose.

On occasion potatoes having so many minor defects as to be refused classification under the Federal standards, but of good size and free from soft rot, will sell at prices almost as high as potatoes graded U. S. No. 1, but of small size. These facts are largely the basis upon which the practice of mixing potatoes in the Boston markets has been built. "Unclassified" potatoes (those not sorted to meet requirements of any grade, sometimes called culls) have a very wide range in price depending on the character of the defects. Although such potatoes may be priced very close to the lower range of U. S. No. 1, it is not unusual for price spreads between culls and U. S. No. 1 to be as wide as 50 to 75 cents per 100 pounds.¹⁹

Cull potatoes of good size are sometimes mixed with the better grades, provided price spreads between wholesale grades are suffi-

¹⁹ Mixing practices probably vary considerably from year to year. The 1939 crop was of small size. Resulting price differentials between grades were wide and encouraged mixing. In years when the potato crop is characteristically of large size, with good quality, and with lower prices which usually accompany such a crop, mixing is not likely to be so attractive.

ciently wide. This demand for small and undergrade potatoes, on the part of some wholesale dealers, is in part a reflection of the pressure exerted by retailers to whom price competition is important. By mixing qualities or by repackaging, retail prices may be reduced and at the same time operating margins may be increased.

In general, consumers do not want small potatoes.²⁰ Consumers, however, are likely to accept a few small potatoes, not because they prefer them but because custom has dictated that they are likely to be in the retail package. This is particularly true in a season like that of 1939-40 when the crop was composed of a large percentage of small potatoes.

Dealers, including retailers, therefore, are between two opposing lines of pressure. On one hand is the desire to furnish consumers with a good-sized potato, free from defects. On the other is the market requirement for low prices. The two are inconsistent, since a package with contents all of which are beyond criticism is likely to be too costly to permit resale in satisfactory volume.

An example of the mixing procedure with its gains is offered, assuming U. S. No. 1 potatoes to be selling at \$2 per 100 pounds, and culls at \$1.50 per 100 pounds, which was not an unusual differential in the spring of 1940. The total cost of two 100-pound bags of potatoes mixed would be \$3.50 or \$1.75 per 100 pounds. If salable at the market price of \$2 for U. S. No. 1 potatoes, there is a gross margin of 25 cents per 100 pounds to cover the cost of the mixing. The mixed lot would probably be sold at a discount from the price of U. S. No. 1, but a substantial increase in gross margin might still result.²¹

The expense of mixing includes the cost of emptying out bags of potatoes and repacking them in new bags. This has been previously estimated at about 4 cents per 100 pounds. To this expense must be added the difference between the cost of the new bag and the reclamation value of the old one, and any shrinkage resulting from the practice.

There are dealers and receivers in the Boston market who deal in the lower grades of potatoes, principally because they have outlets for them. Such dealers may perform a service to producers, as well as to some consumers. They can dispose of the lower grades at prices usually above those paid for byproduct uses. They also supply consumers who want potatoes at a lower price.

Importance of Undergrade Potatoes in Consumer Packages

The inclusion of a high percentage of defective or small potatoes in packages sold as high in quality has about the same significance

²⁰ See reference cited on page 146

to the consumer or the producer whether accomplished by mixing or by some other process. Many lots of potatoes offered to consumers included a wide range in defects and a wide range in composition as to size as will be shown later.

The practice of mixing potatoes deserves careful study. If it reflects a demand for a particular kind and price which consumers actually want, then it may deserve support. If this is true, however, it is equivalent to saying that the standards and grades by which potatoes are packed at the shipping point are not satisfactory to the consumer. In this case, study of the practice should be from the point of view of packing potatoes at the shipping point so as to meet the consumers' requirements because the packing could be done more cheaply there. If, on the other hand, mixing represents only an attempt on the part of the distributor and the retailer to increase profits by marketing low-quality potatoes at prices nearly equal to those of better quality, then steps should be taken to place it under control because it leads to consumer dissatisfaction and thus weakens consumer demand.

The mixing of potatoes may have an even broader significance to the producers. The demand for low quality for mixing probably increases prices for such quality and, thereby, narrows the price margins between low-grade and high-grade potatoes to the producer. At the same time, when these potatoes of lower grade are mixed and sold in competition with the potatoes of higher grade, the price for high-grade potatoes may be lowered because of the increased supply thus further narrowing the margin. If the practice results in consumer dissatisfaction, a decline in demand for potatoes may be experienced. The whole practice, therefore, narrows the price differences between potato grades and averages the quality, making it difficult for a consumer actually desiring top-quality potatoes to purchase them consistently.

This practice and its results tend to destroy incentive on the part of producers to pack top quality and, in the long run, tend to make the packaging and marketing of potatoes on a quality basis more difficult. Such practices expose the producers of an area to loss of income growing out of competition from the same product produced in other areas where these practices are not used. Competition from other food products which are substituted by consumers because of their dissatisfaction with potatoes becomes more effective. In the long run, it is probably better for the industry as a whole that potatoes going out of Maine should be graded, as closely as possible, according to the

²¹ See example, page 60.

desire of consumers who are going to buy and use them. It is probably equally important that the variety, grade, and range in size should be adequately marked on the outside of the consumer package for the consumer's use in purchasing. These are marketing problems of particular interest to producers in the solution of which cooperative marketing organization is likely to be particularly effective.

It should not be inferred that all potato dealers in Boston mix potatoes to the detriment of producers. Some of them do not maintain sufficient help and equipment to engage in either mixing or packaging of retail packages. Others who do have help and equipment apparently pack to rigid standards of quality. Neither is it to be inferred that the mixing or inclusion of a wide range of qualities in retail packages is confined to Boston. The effect of these practices is the same wherever they arise.

Costs of marketing the Maine crop could doubtless be reduced if adequate grading were done in Maine, thereby avoiding the need for regrading in Boston. Adequate marking of packages for consumer and retailer information and protection should be practiced. Sizes and grades should be marked on the packages; and prices for each grade should result from demand as expressed through purchases of available supplies.

The significance of the mixing process as discussed above should be considered by Maine potato producers under many aspects. In the first place, since marketing costs would probably be decreased, all services possible should be rendered in Maine, thus decreasing the operations required at Boston.

To the extent that the mixing practice is designed to increase dealers' margins and if the necessity of raising dealers' margins arises from the fact that many of them have insufficient volume, then Maine producers should seriously consider the various possibilities by which their potatoes may be passed through Boston wholesale markets without being exposed to these practices.

The existence of this practice in Boston also exposes some of the weaknesses of potato-marketing programs designed to protect Boston consumers on a quality basis but operated from Maine. The fact that the potatoes, after reaching Boston, may be repacked in other packages which resemble the original ones in which they were sent out of Maine, excepting that the quality within the package has been considerably changed, may operate to nullify part of the gains for producers in Maine and for consumers in Boston. In addition, the quality aspects of the mixing process have very serious implications from the point of view of advertising the product.

In marketing, a producer must recognize the fact that his product frequently has to be entrusted to others. Efficiency in guarding quality is an important characteristic of an efficient marketing agency. Unless marketing agencies do guard this quality of the product, much good work done by the producer and shipper in trying to build a favorable reputation with both dealers and consumers is likely to be lost. The study revealed instances, however, in which potatoes were passed on to the consumer including a large percentage of defects. This fact indicates that part of the problem of undergrade potatoes found in the wholesale markets, or in the retail packages in the homes of consumers, may be solved at shipping points in Maine.

There are means at the disposal of Maine potato growers and shippers by which they can adopt an aggressive attitude toward their marketing problems. They may make some progress by having their properly constituted administrative authorities work with those in the Commonwealth of Massachusetts and the city of Boston to secure more careful regulation of marketing practices in the Boston market. Another suggestion is that the producers, through their own marketing association, carry their own potatoes into the Boston market, performing at least the initial distribution service there.

CONSUMER PRACTICES IN THE PURCHASE AND USE OF POTATOES

CONSUMERS are the customers who actually buy and use the product. Under competitive conditions in marketing, certain selling advantages accrue to the organization which most accurately interprets the consumers' preferences. Consumers' practices and preferences in the use of potatoes were studied to gather information which would help producers plan a cooperative marketing program and take advantage of consumer preferences in grading and packing their product.

In studying consumer satisfaction in the use of a commodity, it is desirable to consider the things that consumers actually do, as these provide a basis for interpreting expressions of attitudes or desires. It should be recognized, however, that sometimes what the consumer does is dictated by the opportunities at his command. A consumer, for instance, may buy a package of potatoes in which the sizes are mixed, not because of preference, but because in the market potatoes are sold that way and there is no alternative.



FIGURE 18.—Some branded packages in a retail store. Branded packages make an attractive display, but the contents are not easily inspected.

Consumer practices, therefore, will be discussed separately from consumer preferences, recognizing that both are necessary for a study of the problem of providing more satisfactory marketing services.

Procedure of Study

Information was gathered from consumers in Boston by licensed Federal-State fruit and vegetable inspectors, through personal interviews in households. The households were selected by random procedure from the directory of Boston and 13 cities and towns in the Boston metropolitan area which, according to the census taken by the Commonwealth of Massachusetts, in 1935, included more than 5,000 persons per square mile.²² Federal-State fruit and vegetable inspectors were selected for doing the work, because they had adequate knowledge of the United States standards and grades for potatoes. They were able to interpret the responses of consumers in terms of these standards and grades and, therefore, added greatly to the precision of the enumeration. In addition, the interviews were conducted in the households with the last purchase of potatoes or the remaining portion thereof.

To reduce errors resulting from inaccurate memory, questions about the use and the methods of preparation of potatoes were restricted to the 7 days previous to the interview. Data were

²² For a more complete statement of sampling procedure, see Appendix, page 134.

gathered during the period from March 4 to April 6 and again from June 1 to June 29, 1940. Two periods were selected to determine the changes in consumers' habits as related to seasons, different competing foods, and different kinds of potatoes.

Enumerations were made on the basis of population groups including the size of family, the race or nationality of the head of the family, and the weekly family income. Income, as used in this study, was defined as the salary or wages of the head of the family, plus any other items regularly made available for current living expenses. A monthly rental figure was obtained by the enumerators and provided a means of estimating weekly family income in those instances in which the information was not readily available.

Use or Nonuse of Potatoes

The first question asked of each consumer related to the use or nonuse of potatoes. Replies to this question indicated that 97.8 percent of the families used potatoes in some form or other (table 23). The data also show little variation in the percentage of families using potatoes in any income group. As a whole, potatoes were used by a very large proportion of the population in all groups.

TABLE 23.—*Families using potatoes, by income groups, Boston, March and June 1940*

Family income per week	Families interviewed	Families reporting use	Percentage reporting use
	Number	Number	Percent
\$15 or less	286	272	95.1
\$16-\$25	720	699	97.1
\$26-\$35	984	968	98.4
\$36-\$45	714	700	98.0
\$46-\$55	390	386	99.0
\$56 or more	239	235	98.3
Total	3,333	3,260	97.8

¹ Includes four families who used potatoes but ate their meals out.

Use of Potatoes at Meals

Each of the consumers interviewed was asked the number of meals at which potatoes were served on each of the 7 days previous to the date of interview. In a few instances this information was not given, so the number of these reports is less than the number of families reporting use of potatoes. The answers were tabulated according to the particular meal at which potatoes were served, as the morning, the noon, or the evening meal. Sometimes it was difficult for the consumer to remember what meals had included potatoes for a period as long as 7 days. However, 1,709 records were completed representing the same number of family weeks of potato use in the month of March. In June 1,451 records were completed.

Use of Potatoes at the Morning Meal

The number of days each week that potatoes were served at the morning meal by consumers reporting such use during the month of March is shown in table 24. Fourteen and one-tenth percent of the consumers reported use on at least 1 day each week, and of this number, the Italians reported use in a larger proportion of the families than any other race or nationality group. Only 15 of a total of 241 families reported such use at each of 7 morning meals during the week. When classified according to income groups as shown in table 25, it was shown that in March families of low incomes were much more likely to eat potatoes at the morning meal than were families of higher incomes. When classified by size of family groups as in table 26, it was shown that the larger the family the greater the probability that potatoes would be included in the morning meal.

Only 2.8 percent of the families as shown in table 27 reported use at the morning meal in June. This percentage was so small that no further comparison by population groups was made. Only one family out of this group reported the use of potatoes at 7 meals during the week.

TABLE 24.—Families serving potatoes at the morning meal by race or nationality groups, Boston, Mar. 4 to Apr. 6, 1940

Race or nationality	Families serving potatoes—							Total families serving at morning meal	Families reporting use	Percentage serving at morning meal
	1 day	2 days	3 days	4 days	5 days	6 days	7 days			
	Number	Number	Number	Number	Number	Number	Number			
Irish	9	20	14	5	1	0	6	55	356	15.4
Italian	17	21	9	1	0	0	1	49	183	26.8
Jewish	5	1	0	0	0	1	0	7	102	6.9
Negro	2	3	5	1	0	0	0	11	64	17.2
Unclassified white	51	32	20	4	2	2	8	119	1,004	11.8
Total	84	77	48	11	3	3	15	241	1,709	14.1

TABLE 25.—Families serving potatoes at the morning meal, by income groups, Boston, Mar. 4 to Apr. 6, 1940

Family income per week	Families reporting use	Families serving at morning meal	Percentage serving at morning meal
	Number	Number	Percent
\$15 or less	160	32	20.0
\$16-\$25	398	79	19.8
\$26-\$35	525	72	13.7
\$36-\$45	313	37	11.8
\$46-\$55	204	17	8.3
\$56 or more	109	4	3.7
Total	1,709	241	14.1

TABLE 26.—*Families serving potatoes at the morning meal, by size of family groups, Boston, Mar. 4 to Apr. 6, 1940*

Persons in family	Families reporting use	Families serving at morning meal	Percentage serving at morning meal
	Number	Number	Percent
1.....	36	2	5.6
2.....	352	34	9.6
3.....	371	33	8.9
4.....	368	59	16.0
5.....	255	47	18.4
6.....	143	32	22.4
7 or more.....	184	34	18.5
Total.....	1,709	241	14.1

TABLE 27.—*Families serving potatoes at the morning meal, by race or nationality groups, Boston, June 1940*

Race or nationality	Families serving potatoes—							Total families serving at morning meal	Families reporting use	Percentage serving at morning meal
	1 day	2 days	3 days	4 days	5 days	6 days	7 days			
	Number	Number	Number	Number	Number	Number	Number			
Irish.....	4	3	1	0	0	0	0	8	331	2.4
Italian.....	2	0	0	0	0	0	0	2	143	1.4
Jewish.....	1	0	0	0	0	0	0	1	85	1.2
Negro.....	0	1	2	0	2	0	0	5	55	9.1
Unclassified white.....	10	8	3	1	0	1	1	24	837	2.9
Total.....	17	12	6	1	2	1	1	40	1,451	2.8

¹ Out of a total of 1,451 families reporting use of potatoes in June, only 40, or less than 3 percent, reported use at the morning meal and only 1 reported use at 7 meals during the week preceding the interview.

A contributing reason for the increased proportion of consumers using potatoes at breakfast in the larger families and in the lower-income families may lie in competition between food products. Changes in dietary habits on the part of the population have been noted by many authorities on the subject. In this change, one of the important trends has been the increased use of prepared breakfast foods and fruit juices at breakfast. Inasmuch as some of these include items such as fruit juices or cream or prepared breakfast foods, it seems reasonable to believe that to the extent that the pressure of economic circumstances in large or in low-income families is an important factor governing choice of foods, they would be the last to give up the older and less expensive breakfast menus which may have included more potatoes. The morning meal may be one point at which potato consumption has declined in favor of competing foods. This may partly explain the declining use of potatoes per capita.

Another point of interest in connection with tables 24, 25, 26, and 27 is the fact that relatively few of the families reported use of potatoes at breakfast each morning of the week. The significance of this fact to producers of potatoes and potato-marketing organiza-

tions is that in such cases the consumers' satisfaction may play a more important role. These consumers have experience in the use of food items other than potatoes for breakfast. If, for any reason, they become dissatisfied with potatoes, it is relatively easy for them to shift completely to some other food product. On the other hand, the more their satisfaction with the quality or the variety of potatoes is increased, the less will be their tendency to further discontinue their use. Producers, therefore, in their production practices and through their marketing organizations, should consider the factors which influence consumer satisfaction and contribute to greater stability in the consumers' use of their product. It is to this extent that the consumers' problem in buying and using products which give satisfaction is also the producers' marketing problem.

Use of Potatoes at the Noon Meal

Almost two-thirds of the families reported the use of potatoes at the noon meal at least once during the week previous to the interview. As indicated in table 28, there was very little difference in March between race or nationality groups and the proportion of families serving potatoes at least once at a noon meal during the week previous to enumeration. However, only among the Irish was the number of families using potatoes 7 days a week in excess of the number using potatoes only 1 day a week. In June, however, as indicated in table 29, there was little stability on a nationality basis in the proportion of families using potatoes in the noon meal. In June old potatoes were limited in supply and likely to be soft and sprouting. New potatoes were readily available in the market and were being made available in increased supply. The results of the factors seem to show up in table 29. Although 70 percent of the consumers still using old potatoes reported serving at the noon meal at least 1 day a week during the first half of June, only 53 percent of them reported as frequent use in the last half of June. In addition to the declining proportion reporting the use of old potatoes at the noon meal, the number reporting the use of old potatoes at all had declined.

With reference to new potatoes, the number of families reporting their use in the first half of June was 246, with approximately 66 percent of the families using them reporting use at least once a week at the noon meal. For the second half of June, the number of families reporting was 437, and the proportion reporting use at the noon meal almost identical with that of the first half of June. In the process of making this shift from old to new potatoes, however, the percentages in the various race or nationality groups were very different from those in March.

TABLE 28.—Families serving potatoes at the noon meal, by race or nationality groups, Boston, Mar. 4 to Apr. 6, 1940

Race or nationality	Families serving potatoes—							Total families serving at noon meal	Families reporting use	Percentage serving at noon meal
	1 day	2 days	3 days	4 days	5 days	6 days	7 days			
	Number	Number	Number	Number	Number	Number	Number	Number	Number	Percent
Irish	32	27	41	19	16	7	77	219	356	61.5
Italian	31	21	20	11	15	9	12	119	183	65.0
Jewish	27	9	9	5	2	3	9	64	102	62.7
Negro	6	4	6	8	5	1	12	42	64	65.6
Unclassified white	201	90	100	53	25	26	136	631	1,004	62.8
Total	297	151	176	96	63	46	246	1,075	1,709	62.9

TABLE 29.—Families serving potatoes at the noon meal, by race or nationality groups, Boston, June 1940

Date and race or nationality	Old potatoes			New potatoes		
	Families reporting use	Families serving at noon meal	Percentage serving at noon meal	Families reporting use	Families serving at noon meal	Percentage serving at noon meal
	Number	Number	Percent	Number	Number	Percent
June 1-15:						
Irish	129	75	58.1	56	31	55.4
Italian	56	40	71.4	24	16	66.7
Jewish	18	6	33.3	22	11	50.0
Negro	20	13	65.0	5	4	80.0
Unclassified white	285	223	78.2	139	100	71.9
Total	508	357	70.3	246	162	65.8
June 16-25:						
Irish	55	24	43.6	91	59	64.8
Italian	14	9	64.3	49	29	59.2
Jewish	14	5	35.7	31	14	45.2
Negro	17	7	41.2	13	8	61.5
Unclassified white	160	93	58.1	253	177	70.0
Total	260	138	53.1	437	287	65.7

Data showing the percentages of families using potatoes at one or more noon meals each week, in March and in June, are shown classified both by income and by size of family in tables 30 and 31. When classified by size of family, the percentages indicated that the noon meal use of potatoes increased as the number of persons per family increased. This perhaps reflects the fact that persons with large families have smaller incomes per capita and, therefore, use more potatoes as a source of food.

When classified according to weekly family income, the proportion of families using potatoes at least one meal a week in March declined when income increased. The relationship here is just the opposite from that shown in connection with the number of persons per family, probably for the same reason. In June, however, the relationships were erratic and inconclusive, indicating that in the shift from old to new potatoes regular habits of family use were changed.

TABLE 30.—Families serving potatoes at the noon meal, by size of family group, Boston, March and June 1940

Month and persons in family	Families reporting use	Families serving at noon meal	Percentage serving at noon meal
March:	<i>Number</i>	<i>Number</i>	<i>Percent</i>
1	36	24	66.7
2	352	195	55.4
3	371	218	58.8
4	368	229	62.2
5	255	176	69.0
6	143	100	69.9
7 or more	184	133	72.3
Total	1,709	1,075	62.9
June—old potatoes:			
1	41	13	31.7
2	161	91	56.5
3	182	112	61.5
4	135	95	70.4
5	98	75	76.5
6	72	55	76.4
7 or more	79	54	68.4
Total	768	495	64.4
June—new potatoes:			
1	9	3	33.3
2	136	81	59.6
3	173	100	57.8
4	128	92	71.9
5	102	71	69.6
6	64	47	73.4
7 or more	71	55	77.5
Total	683	449	65.7

TABLE 31.—Families serving potatoes at the noon meal, by income groups, Boston, March and June 1940

Month and family income per week	Families reporting use	Families serving at noon meal	Percentage serving at noon meal
March potatoes:	<i>Number</i>	<i>Number</i>	<i>Percent</i>
\$15 or less	160	133	83.1
\$16-\$25	398	285	71.6
\$26-\$35	525	325	61.9
\$36-\$45	313	173	55.3
\$46-\$55	204	111	54.4
\$56 or more	109	48	44.0
Total	1,709	1,075	62.9
June—old potatoes:			
\$15 or less	74	44	59.4
\$16-\$25	163	83	50.9
\$26-\$35	219	151	68.9
\$36-\$45	183	130	71.0
\$46-\$55	82	59	72.0
\$56 or more	47	28	59.6
Total	768	495	64.4
June—new potatoes:			
\$15 or less	24	15	62.5
\$16-\$25	117	79	67.5
\$26-\$35	198	135	68.2
\$36-\$45	184	126	68.5
\$46-\$55	85	55	64.7
\$56 or more	75	39	52.0
Total	683	449	65.7

These data represent only families using potatoes at one or more meals per week. More detailed analysis of these data indicated that the increased percentage of families using potatoes associated with the large number of persons per family and low incomes per family was also associated with the use of potatoes at a larger number of meals per week. Although the data presented here do not include this detail, it is the logical result of the reasons given for the relationships shown.

These data, showing use of potatoes at the noon meal, like those showing use at the morning meal, also show that substitutes were used freely. This is evidenced by the fact that a large percentage of the families reported no use during the week. Also there were many meals at which potatoes were not served by those who reported their use at least once. To producers of potatoes substitution is a form of competition. This suggests the need for more concern, on the part of producers, in consumer satisfaction.

Use of Potatoes at the Evening Meal

Of the families reporting the use of potatoes in March, 95.6 per cent reported their use at the evening meal (table 32), and of these the larger proportion reported use at more than half of the evening meals during the week. Use of potatoes at the evening meal had more of the characteristics of habit than in the case of either the morning

TABLE 32.—*Families serving potatoes at the evening meal, by race or nationality, size of family, and income groups, Boston, Mar. 4 to Apr. 6, 1940*

Classification of family by—	Families reporting use	Families serving at evening meal	Percentage serving at evening meal
	Number	Number	Percent
Race or nationality:			
Irish.....	356	341	95.8
Italian.....	183	175	95.6
Jewish.....	102	97	95.1
Negro.....	64	58	90.6
Unclassified white.....	1,004	963	95.9
Total.....	1,709	1,634	95.6
Persons in family:			
1.....	36	30	83.3
2.....	352	329	93.5
3.....	371	356	96.0
4.....	368	358	97.3
5.....	255	246	96.5
6.....	143	140	97.9
7 or more.....	184	175	95.1
Total.....	1,709	1,634	95.6
Family income per week:			
\$15 or less.....	160	144	90.0
\$16-\$25.....	398	381	95.7
\$26-\$35.....	525	502	95.6
\$36-\$45.....	313	302	96.5
\$46-\$55.....	204	199	97.5
\$56 or more.....	109	106	97.2
Total.....	1,709	1,634	95.6

or the noon meal, at which use tended to be only occasional. Among race or nationality groups reporting in March there was very little difference in proportion reporting use except among the Negroes, who used potatoes at the evening meal less frequently than any of the other groups. When classified according to size of family, the proportion of users tended to increase as the number of persons per family increased up to about four persons per family.

When classified according to income, the proportion of families using potatoes at one or more evening meals per week was about the same excepting for the lower-income groups. This group, however, included some families of only one person, in which case it is to be expected that a considerable number of meals were eaten away from home. The use of potatoes at one or more evening meals per week by families reporting use in June is shown in table 33. These data are divided between families using old and new potatoes. As in table 32, shown previously, the Negroes used potatoes less regularly at the evening meal than any other nationality group. Also, families using new potatoes used them less regularly than families using old potatoes. However, the proportion reporting use of either old or new potatoes at the evening meal was very high. Irregularity of use when associated with increase in size of family as related to March reports was also shown as previously in the period of change from old to new potatoes.

TABLE 33.—Families serving potatoes at the evening meal, by race or nationality, size of family, and income groups, Boston, June 1940

Classification of family by—	Old potatoes			New potatoes		
	Families reporting use	Families serving at evening meal	Percentage serving at evening meal	Families reporting use	Families serving at evening meal	Percentage serving at evening meal
Race or nationality:	<i>Number</i>	<i>Number</i>	<i>Percent</i>	<i>Number</i>	<i>Number</i>	<i>Percent</i>
Irish.....	184	174	94.6	147	134	91.2
Italian.....	70	68	97.1	73	66	90.4
Jewish.....	32	32	100.0	53	52	98.1
Negro.....	37	35	94.6	18	15	83.3
Unclassified white.....	445	423	95.0	392	355	90.6
Total.....	768	732	95.3	683	622	91.1
Persons in family:						
1.....	41	38	92.7	9	9	100.0
2.....	161	149	92.5	136	114	83.8
3.....	182	174	95.6	173	161	93.1
4.....	135	132	97.8	128	117	91.4
5.....	98	97	99.0	102	93	91.2
6.....	72	66	91.7	64	58	90.6
7 or more.....	79	76	96.2	71	70	98.6
Total.....	768	732	95.3	683	622	91.1
Family income per week:						
\$15 or less.....	74	66	89.2	24	20	83.3
\$16-\$25.....	163	159	97.5	117	105	89.7
\$26-\$35.....	219	207	94.5	198	182	91.9
\$36-\$45.....	183	177	96.7	184	171	92.9
\$46-\$55.....	82	78	95.1	85	79	92.9
\$56 or more.....	47	45	95.7	75	65	86.7
Total.....	768	732	95.3	683	622	91.1

Although these data show more general use at the evening meal, they also indicate that frequently substitutions were made, as indicated by the fact that at some meals potatoes were not used. Frequently other items of food are used instead of potatoes, even though potatoes were likely to be relatively low in price.

It is not proposed that any attempt should be made to influence consumers to eat potatoes at every meal. It is probably true, however, that variety in foods available for general use has been increasing over a considerable number of years, which fact is undoubtedly associated with the declining trend of per capita use of potatoes. Producers of potatoes, therefore, in their own interests should adopt practices in marketing which are feasible for the purpose of increasing the satisfaction of potatoes to consumers. High prices and unsatisfactory quality are likely to contribute to a continuation of the shift to variety in foods and a continued downward trend in the use of potatoes per capita. Prices competitively favorable to the use of potatoes and satisfactory quality available for the consumers' use are likely to retard this trend. To this extent, therefore, the producers of potatoes should interest themselves in improving their marketing practices so as to retain for their product as much as possible of the present demand.

Frequency of Purchase

Consumers were asked the date of their last potato purchase. Of the 1,717 who gave replies, 1,135, or 66.1 percent, reported the last purchase in the week preceding the interview. This shows about 66.1 percent of the consumers would be expected to make at least one potato purchase each week.

Table 34 shows the results of tabulation of the replies on frequency of purchase. Reported purchases in the 8 to 15-day period were 26.4 percent of the total, and purchases in the period exceeding 15 days were 7.5 percent of the total. This does not mean that 66.1 percent of the families purchase potatoes once a week or that 26.4 percent purchase at 2-week intervals. It merely means that in any average week 66.1 percent of the population surveyed might be expected to make at least one purchase. The time which might

TABLE 34.—*Frequency of family purchase of potatoes, Boston, Mar. 4 to Apr. 6, 1940*

Days since last purchase	Families reporting	Percentage of total
	<i>Number</i>	<i>Percent</i>
1 to 7.....	1,135	66.1
8 to 15.....	454	26.4
More than 15.....	128	7.5
Total.....	1,717	100.0

clapse before these same consumers call to make another purchase is not indicated.

The 7.5 percent reporting purchases at an interval of over 2 weeks is only one-third of the number who purchased potatoes at intervals of more than 2 weeks. Another third or 7.5 percent is included in the group reporting their last purchase in the second week previous to the interview, and still another 7.5 percent in the 1-to-7-day period; thus the percentage of families characteristically purchasing at 2-week intervals is not 26.4 percent as indicated in table 34 but 26.4 less 7.5, or 18.9 percent.

Following this line of reasoning, the most likely pattern of purchase in this period is indicated in table 35 which shows estimates of the percentages of (1) families which purchase at least once in each week, (2) families which purchase at 2-week intervals, and (3) families which purchase potatoes at intervals of more than 2 weeks.

In table 36 it is shown that in March the percentage of families purchasing within 7 days prior to the date of interview increased rapidly as the number of persons in the family increased. This reflects a greater frequency of purchase on the part of large families, which, although often purchasing the same quantities as smaller families, used more potatoes, and, therefore, purchased them more frequently.

TABLE 35.—*Estimated interval since last family purchase of potatoes, Boston, Mar. 4 to Apr. 6, 1940*

Days since last purchase	Percentage of families purchasing			
	First week	Second week	More than 2 weeks	Total
	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
More than 15	7.5	7.5	7.5	22.5
8-15	18.9	18.9		37.8
1-7	39.7			39.7
Total	66.1	26.4	7.5	100.0

TABLE 36.—*Families reporting purchases and those making last purchase of potatoes within 7 days of date of interview, by size of family groups, Boston, March 1940*

Persons in family	Families reporting purchases	Families reporting last purchase within 7 days	Percentage reporting last purchase within 7 days
	<i>Number</i>	<i>Number</i>	<i>Percent</i>
1	36	7	19.4
2	352	194	55.1
3	372	240	64.5
4	370	257	69.4
5	250	173	69.2
6	148	115	77.7
7 or more	189	149	78.8
Total	1,717	1,135	66.1

A slightly larger proportion of the families interviewed in June, who reported the purchase of old potatoes, indicated that they purchased within 7 days of the date of enumeration (table 37).

Purchasers of new potatoes in June bought them even more frequently than purchasers of old potatoes, as indicated in table 38. Here again, however, the average frequency of purchase as related to the number of persons per family was strongly upward. This greater frequency of purchase in June was associated with a tendency to make smaller purchases. At this time of year, for instance, old potatoes were sprouting and were inclined to be more perishable than earlier in the year. Consumers, therefore, purchased in smaller quantities. The evident tendency to make smaller purchases of new potatoes may have been partly because new potatoes were relatively more expensive and the price was declining.

TABLE 37.—Families reporting purchases and those making last purchase of old potatoes within 7 days of date of interview, by size of family groups, Boston, June 1940

Persons in family	Families reporting purchases	Families reporting last purchase within 7 days	Percentage reporting last purchase within 7 days
	Number	Number	Percent
1	43	30	69.8
2	158	99	62.6
3	180	120	66.7
4	137	100	73.0
5	98	74	75.5
6	71	54	76.0
7 or more	78	64	82.0
Total	765	541	70.7

TABLE 38.—Families reporting last purchase of new potatoes within 7 days of date of interview, by size of family groups, Boston, June, 1940

Persons in family	Families reporting purchases	Families reporting last purchase within 7 days	Percentage reporting last purchase within 7 days
	Number	Number	Percent
1	10	5	50.0
2	138	106	76.8
3	177	145	81.9
4	127	108	85.0
5	101	93	92.1
6	64	57	89.1
7 or more	70	63	90.0
Total	687	577	84.0

Size of Purchase

Among the Boston families in March who reported their last purchase within 7 days of the date of enumeration, 66.6 percent reported

TABLE 39.—Families reporting purchases of various quantities of potatoes within 7 days of the date of enumeration, by income groups, Boston, March, 1940

Family income per week	Families reporting purchases	Percentage of families reporting purchases of—				
		1-6 pounds	7-14 pounds	15 pounds	16 pounds or more	Total
		Number	Percent	Percent	Percent	Percent	Percent
\$15 or less.....	108	19.4	17.6	60.2	2.8	100.0
\$16-\$25.....	284	13.0	23.3	61.6	2.1	100.0
\$26-\$35.....	344	6.7	16.8	75.6	.9	100.0
\$36-\$45.....	191	12.5	19.4	63.9	4.2	100.0
\$46-\$55.....	137	8.0	24.8	64.3	2.9	100.0
\$56 or more.....	69	14.5	21.7	63.8	.....	100.0
Total.....	1,133	11.1	20.2	66.6	2.1	100.0

their last purchase as 15 pounds. In table 39, these families are classified according to family income. They show that 15-pound or 1-peck purchases in the medium-income groups were somewhat higher than in either the low- or the high-income groups. The low-income group included a larger percentage of Negroes and Italians and families of one. These population groups were more likely to buy smaller quantities. In the high-income group, it will be recalled, were those who used potatoes less frequently at the morning and noon meals and those who were not so price conscious as to buy the larger packages because they were cheaper. In all income groups, however, the 15-pound or 1-peck packages were purchased most frequently during the month of March.

When classified according to size of family as in table 40, the data show that the proportion of families buying 15 pounds at a purchase increased as the number of persons per family increased. This trend was also found among families buying more than 15 pounds at a purchase. In the families making smaller purchases, the proportion declined as the size of family increased.

In June, as previously indicated, the proportion of families purchasing 1 peck of potatoes at a time was smaller. For old potatoes,

TABLE 40.—Families reporting purchases of various quantities of potatoes within 7 days of the date of enumeration, by size of family groups, Boston, March 1940

Persons in family	Families reporting purchases	Percentage of families reporting purchases of—				
		1-6 pounds	7-14 pounds	15 pounds	16 pounds or more	Total
		Number	Percent	Percent	Percent	Percent
1.....	7	57.1	42.9	.....	.....	100.0
2.....	194	28.9	31.4	39.2	0.5	100.0
3.....	240	10.4	27.9	60.9	.8	100.0
4.....	256	6.6	21.1	71.9	.4	100.0
5.....	172	7.6	14.5	76.7	1.2	100.0
6.....	115	5.2	7.0	82.6	5.2	100.0
7 or more.....	149	3.4	7.4	81.2	8.0	100.0
Total.....	1,133	11.1	20.2	66.6	2.1	100.0

as indicated in table 41, it was only 47.1 percent. The proportion of families purchasing increased as the number of persons in the family increased. Relatively few families bought more than 15 pounds. With smaller quantities, as in March, the proportion of families buying declined as the number of persons in the family increased. These tables show strikingly the relationship between the size of purchase and the size of family.

TABLE 41.—Families reporting purchases of various quantities of old potatoes within 7 days of the date of enumeration, by size of family groups, Boston June 1940

Persons in family	Families reporting purchases	Percentage of families reporting purchases of—				
		1-6 pounds	7-14 pounds	15 pounds	16 pounds or more	Total
	Number	Percent	Percent	Percent	Percent	Percent
1	30	86.7	10.0	3.3		100.0
2	99	46.5	35.3	18.2		100.0
3	120	25.8	33.3	40.9		100.0
4	100	19.0	29.0	52.0		100.0
5	74	12.2	23.0	63.5	1.3	100.0
6	54	13.0	18.5	68.5		100.0
7 or more	64	4.7	10.9	79.7	4.7	
Total	541	26.1	26.1	47.1	0.7	100.0

In the case of new potatoes, there was a strong shift during the month of June; therefore, data for this month are presented in two parts, those for the period from June 1 to June 15 and those for the period from June 17 to June 29. In the first half of June, as shown in table 42, only 12.3 percent of the consumers interviewed reported the purchase of 15 pounds of potatoes at a time. The largest percentage bought 6 pounds or less, with an intermediate group buying from 7 to 14 pounds, probably half pecks. None reported the purchase of 16 pounds or more. In the second half of June, there was a shift in these percentages; 37.8 percent reported the purchase of 15 pounds, a few families reported 16 pounds or more, 36.7 percent

TABLE 42.—Families reporting purchases of various quantities of new potatoes within 7 days of the date of enumeration, by size of family groups Boston, June 1-15, 1940

Persons in family	Total families reporting purchases	Percentage of families reporting purchases of—				
		1-6 pounds	7-14 pounds	15 pounds	16 pounds or more	Total
	Number	Percent	Percent	Percent	Percent	Percent
1	2	100.0				100.0
2	47	78.7	21.3			100.0
3	59	69.5	28.8	1.7		100.0
4	35	60.0	25.7	14.3		100.0
5	29	58.6	34.5	6.9		100.0
6	19	31.6	36.8	31.6		100.0
7 or more	21	33.3	9.5	57.2		100.0
Total	212	61.8	25.9	12.3		100.0

7 to 14 pounds, and only 24.7 percent reported from 1 to 6 pounds (table 43). These figures show a rather important shift in the average size of purchase; that is, the average quantity declined for old potatoes as compared with March and tended to increase for new potatoes as the season advanced.

TABLE 43.—Families reporting purchases of various quantities of new potatoes within 7 days of the date of enumeration, by size of family groups Boston, June 17-29, 1940

Persons in family	Total families reporting purchases	Percentage of families reporting purchases of—				
		1-6 pounds	7-14 pounds	15 pounds	16 pounds or more	Total
	<i>Number</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
1.....	3	66.7		33.3		100.0
2.....	59	45.8	35.6	18.6		100.0
3.....	86	31.4	46.5	22.1		100.0
4.....	73	26.0	41.1	32.9		100.0
5.....	64	12.5	40.6	46.9		100.0
6.....	38	10.5	15.8	68.4	5.3	100.0
7 or more.....	42	7.1	26.2	64.3	2.4	100.0
Total.....	365	24.7	36.7	37.8	0.8	100.0

The importance of these data from the point of view of a marketing program lies in the fact that they show the 15-pound or 1-peck package in Boston to be a satisfactory one from the point of view of consumers, provided the price is not fluctuating and the quality of the potatoes is stable enough to recommend such a purchase. When the quality became unstable, the average size of the purchase declined. This was particularly evident in the March survey which disclosed a few purchases of 100 pounds or more bought from several weeks to 2 or 3 months prior to the date of interview, while purchases made in March rarely were as large as 100 pounds. Even in March the potatoes were beginning to sprout or become less satisfactory with respect to keeping qualities. Consumers, therefore, did not want to buy large quantities to keep in the home.

TABLE 44.—Day of last purchase of potatoes as reported by 3,144 Boston families, classified according to size of family, March and June 1940

Persons in family	Total families reporting	Percentage of families reporting last purchase on—							Total
		Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	
	<i>Number</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
1.....	88	9.1	4.6	12.5	9.1	22.7	40.9	1.1	100.0
2.....	642	13.2	10.8	9.0	7.7	10.7	47.5	1.1	100.0
3.....	727	10.7	7.4	9.8	8.4	14.2	49.1	.4	100.0
4.....	630	9.7	9.8	9.7	8.3	13.3	48.6	.6	100.0
5.....	443	8.6	9.0	8.4	8.4	15.8	49.8		100.0
6.....	281	8.9	8.2	9.9	6.8	16.0	50.2		100.0
7 or more.....	333	12.3	10.5	15.6	10.8	11.1	39.7		100.0
Total.....	3,144	10.7	9.1	10.1	8.3	13.6	47.7	.5	100.0

All the data were combined in table 44 which shows that about 10 percent of the consumers had made their last purchase on Monday, Tuesday, or Wednesday. A slightly smaller percentage reported purchase on Thursday. A larger percentage reported purchase on Friday and almost half of the consumers had made their last purchase on Saturday. These data are significant to an association planning a marketing program, because they show that the peak load of consumers' purchases comes on Friday and Saturday.

Method of Preparing Potatoes

Consumers were asked to show, for each of the 7 days preceding the date of enumeration and for each meal, the fact that potatoes were or were not used and the method of preparation. These data are presented only for the month of March. Table 45 shows, by race or nationality groups, the percentage of families using different methods of preparation at the evening meal. Table 46 shows by income groups the same data for the same meal. Evidence of difference in the method of preparation by race and nationality groups was not important but, when classified on the basis of average weekly income, the percentage of families preparing boiled potatoes declined as income increased and the percentage using baked potatoes increased as income increased. For other methods of preparation, there was no noticeable difference.

The same data are shown by meals in table 47. Here it is shown that 86.6 percent of the consumers reporting use at the morning meal fried them. At the noon meal, more potatoes were boiled than were prepared in any other manner, and at the evening meal, Boston consumers used more potatoes baked. This large percentage of baked potatoes is of particular importance because as, will be shown later, consumers had preferences for potatoes for baking.

TABLE 45.—*Methods of preparing potatoes for the evening meal, by race or nationality groups, Boston, Mar. 4, to Apr. 6, 1940*

Race or nationality	Servings during week	Percentage of servings in indicated form -						Total
		Boiled	Baked	Mashed	Fried	French fried	Other	
	<i>Number</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Irish	2,005	30.0	31.8	19.0	15.5	2.6	1.1	100.0
Italian	786	33.7	28.8	19.7	12.8	3.1	1.9	100.0
Jewish	471	31.8	33.6	20.6	10.2	1.9	1.9	100.0
Negro	309	28.8	35.0	14.2	19.7	1.3	1.0	100.0
Unclassified white	5,053	27.9	36.8	18.3	11.7	3.9	1.4	100.0
Total	8,624	29.2	34.6	18.6	12.9	3.3	1.4	100.0

TABLE 46.—*Methods of preparing potatoes for the evening meal, by income groups, Boston, Mar. 4 to Apr. 6, 1940*

Family income per week	Servings during week	Percentage of servings in indicated form—						Total
		Boiled	Baked	Mashed	Fried	French fried	Other	
	<i>Number</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
\$15 or less	690	35.8	28.7	16.9	15.4	2.2	1.0	100.0
\$16-\$25	1,842	33.3	29.4	17.5	14.0	2.9	2.9	100.0
\$26-\$35	2,680	28.2	33.9	21.0	11.8	4.3	.8	100.0
\$36-\$45	1,716	27.8	37.9	19.1	12.1	2.4	.7	100.0
\$46-\$55	1,103	26.7	39.2	15.7	12.0	4.1	2.3	100.0
\$56 or more	593	21.3	42.8	17.0	15.9	2.5	.5	100.0
Total	8,624	29.2	34.6	18.6	12.9	3.3	1.4	100.0

TABLE 47.—*Methods of preparing potatoes for morning, noon, and evening meals, Boston, Mar. 5 to Apr. 6, 1940*

Method of preparing potatoes	Number of servings			Percentage of servings		
	Morning	Noon	Evening	Morning	Noon	Evening
	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Boiled	3	1,202	2,514	0.6	33.0	29.2
Baked	12	1,041	2,987	2.2	28.6	34.6
Mashed	6	868	1,603	1.1	23.8	18.6
Fried	467	444	1,113	86.6	12.2	12.9
French fried	49	41	286	9.1	1.1	3.3
Other	2	48	121	.4	1.3	1.4
Total	539	3,644	8,624	100.0	100.0	100.0

Potato Substitutes

Among the commodities listed as substitutes for potatoes by Boston consumers were baked beans, parsnips, turnips, carrots, asparagus, tomatoes, greens of several kinds, cabbage, celery, corn, snap beans, and peas. Also mentioned as substitutes for potatoes were soups, macaroni, spaghetti, noodles, rice, pancakes, waffles, and bread.

Use of Other Fresh Fruit and Vegetable Items

Boston consumers who made their last purchase of potatoes within 1 to 7 days of the date of enumeration were asked to report the number of other fresh fruit and vegetable items purchased within the same week. These data for the entire sample including both March and June are summarized in table 48. The use of 5 or less other fresh fruit and vegetable items was reported by 5.3 percent of the families reporting. The percentage of families reporting in this group declined rapidly as the family income increased. Although 44.7 percent of the consumers reported the use of 6 to 10 items, the percentage declined as incomes increased.

TABLE 48.—Percentage of families purchasing potatoes within 1-7 days of the date of enumeration, classified by number of fresh fruit and vegetable items bought and by income groups, Boston, March and June 1940

Family income per week	Total families reporting purchases	Percentage of families reporting purchases—				
		5 items or less	6-10 items	11-15 items	16 or more items	Total
	<i>Number</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
\$15 or less.....	179	19.6	58.1	18.4	3.9	100.0
\$16-\$25.....	500	8.6	57.0	29.6	4.8	100.0
\$26-\$35.....	655	4.1	49.3	36.2	10.4	100.0
\$36-\$45.....	466	1.3	41.0	41.4	16.3	100.0
\$46-\$55.....	271	1.5	25.1	42.4	31.0	100.0
\$56 or more.....	172	1.8	18.0	40.1	40.1	100.0
Total.....	2,243	5.3	44.7	35.4	14.6	100.0

Only 35.4 percent of the consumers reported the use of 11 to 15 items, but in this group the proportion increased as incomes increased. In the group of 14.6 percent of the consumers reporting 16 items or more purchased within the 7 days prior to the date of enumeration, the percentage of families reporting increased rapidly as the income increased. These data show that consumers tend to get more variety in fresh fruit and vegetable items as incomes are increased. Very few consumers with \$56 or more for weekly income consume only 5 or less fresh fruit and vegetable items, whereas over 80 percent of them use 11 items or more.

Increasing Variety of Foods

There are those who maintain that the number and variety of foods available for the consumers' use increases from year to year. The ingenuity of the agriculturist has made such additional fruits as the avocado, the tangerine, and others available in the market place. More important than this is the fact that due to the ingenuity of the market men many fruits and vegetables long known and used now come to the market in much greater quantities than in years past. In addition, manufacturers and processors have developed new means of making food products attractive to consumers. Tomato juice, for instance, is canned and is used in considerable volume in this form throughout the year. The volume of canned fruits and vegetables and frozen foods offered for the consumers' use is an instance of the increased ingenuity of manufacturers and processors in the field of food supplies. Home economists and dieticians have also contributed to the variety of uses for foods. The testing of health-contributing qualities of the various foods and the preparation of a very wide number of menus for the combination of food products evidence the contribution of home economists and nutritionists in this field.

As a result of this trend toward increased variety in the use of foods the demand for some products has increased. The demand for potatoes, on the other hand, and for some others among the less perishable fresh vegetables, has not increased. Prior to the time when the more perishable fresh fruits and vegetables were made more readily available throughout the marketing year, the supply at some seasons was limited to the less perishable items.

Some economists maintain that the consumption of food is limited. Others maintain that the population of the United States, on the average, is less active than in some earlier generations. These would also argue that the quantity of food necessary for maintaining an average person under present conditions is less than it was in earlier years.

To the extent that the capacity of an individual to consume food is fixed, the increased demand for all food products must arise from the fact of increasing population. It has been shown earlier that this fact has been the most important factor in maintaining the potato industry at its present level of output.

With increasing supplies and greater variety of other foods coming in to the market and being used by consumers, and with the capacity of the average person to consume food limited, it follows that those foods which were in earlier years the principal source of supply for the population must give way if the newer ones are to be consumed, unless the population is increasing fast enough to absorb all the increased production of the newer products. This greater variety of foods partly explains why the use of potatoes per capita has declined for a great many years. The growing population explains why production has been maintained for a great many years at a relatively stable level, but has not enjoyed an increase consistent with the trend of increase in population.

It is impossible to forecast the end of these various trends. There are those who maintain that the upward trend of population is already approaching its maximum.²³ There are also those who hold that standards of living may be reduced in the United States as the result of international warfare, in which case the trend toward greater variety in foods may be checked, because of the limited ability of the population to buy them. The data here presented would indicate the likelihood that a declining national income would have its effect upon the variety of fresh fruit and vegetable items purchased. It would also indicate that there might be some increased demand for potatoes as a result.

²³ A GRAPHIC SUMMARY OF PHYSICAL FEATURES AND LAND UTILIZATION IN THE UNITED STATES. By O. E. Baker, U. S. D. A. Misc. Pub. No. 260, 1937, 57 pages. See p. 56.

A graphic summary of farm labor and population, pp. 42 and 45. By J. C. Fulsum and O. E. Baker, U. S. D. A. Misc. Pub. 265, 48 pages.

CONSUMER PREFERENCES FOR POTATOES

FARMERS should be interested in the degree of satisfaction with which their products are used in the homes of consumers, because consumer satisfaction has a stimulating influence upon demand. This is particularly true of a product which, like potatoes, has a declining trend of per capita use. Anything which producers can do in the production and marketing of their product to increase the consumers' satisfaction is likely to retard the declining trend. When a product satisfies the consumer, it tends to occupy a more permanent place in the family budget, and the appeal of substitutes becomes less convincing. As the consumers' satisfaction is increased, the producer's position in the market is strengthened. Producers and consumers have common ground, therefore, in the fact that when producers supply a satisfactory product and marketing agencies are efficient in its distribution, both the producer and the consumer are likely to be benefited.

In view of the fact that no organized study had previously been made, and since no data were available directing attention to the characteristics of the problem most likely to yield immediate results, studies were made in Boston for the purpose of learning more about consumer preferences. With this information and that previously presented on the nature of the markets and marketing practices in selling Maine potatoes in Boston, it was proposed to evaluate marketing procedure.

Often a marketing organization, whether private or cooperative, finds that it controls too small a part of the volume available for distribution in the area to make its plans in terms of the area as a whole. In other cases, the area itself represents too small a part of the total production marketed to make area planning on an industry basis effective. Although Maine produces approximately 12 percent of the total of potato crops for marketing, the activities of Maine potato growers are likely to be ineffective with reference to the total potato marketing problem. In addition, the Maine crop, although the largest for any one single State, is in the hands of a great many marketing agencies, both cooperative and private, and the activities of any one of them is likely to be ineffective from the point of view of the area as a whole.

The procedure for effective selling on the part of any marketing agency is, under such conditions, competitive. It suggests, in addition to grading and packaging, a development of trade-marks for purposes of identifying the product as different from similar products in the market. This is usually known as product differentiation. To be most effective, it usually requires direct selling efforts in the form of advertising or retailer service. It also requires that organiza-

tion for handling and selling the product be such that the consumer will receive the packages and grades with the desired characteristics. A knowledge of these desirable characteristics and their inclusion in the consumer package is likely to help materially in planning an effective selling program. The gains in gross income from such a plan of distribution are likely to be partly lost in the increased cost of selling, particularly at the beginning. Such a program, however, is likely to be cumulative in its results, the selling cost declining as volume is increased.

The consumer is after all the final customer for the product. Frequently small changes in the type of product packed, in the kind of package used, and in the method of its sale may add materially to the consumers' satisfaction. Frequently also the inclusion of these desirable characteristics entails little added expenses and sometimes only more care in handling. Sometimes the increase in satisfaction or preference may not be sufficient to cause any material gain in price. Nevertheless, the inclusion of an additional service increases the probability of choice of the article and directs demand to the product in which the service has been included.

Method of Selection

Consumers were asked to tell whether they made potato selections in retail stores personally or left the selection to the retailer. In the case of branded consumer packages which were fastened with a wire, consumer selection would be impossible unless the wire were removed and the contents of the bag personally inspected. Since this procedure usually was inconvenient, those families who purchased potatoes by personal selection rarely bought branded packages.

Although some consumers probably make personal selection a habit, the reasons for personal selections by a large percentage of consumers should be looked for in the consumers' desire to get partic-

TABLE 49.—Families making personal selection of potato purchases, by income groups, Boston, Mar. 4 to Apr. 6, 1940

Family income per week	Total families reporting	Families making personal selection	
		Total	Percentage of families in group
	Number	Number	Percent
\$15 or less.....	170	93	54.7
\$16-\$25.....	415	181	43.5
\$26-\$35.....	546	197	36.1
\$36-\$45.....	325	104	32.0
\$46-\$55.....	208	55	26.4
\$56 or more.....	110	26	23.6
Total.....	1,775	656	37.0

ular characteristics of package or product for home use. (Table 47.) It also provides evidence that in the branded packages, or in packages selected by retailers, these characteristics were not included to the consumers' satisfaction. (Fig. 18, page 62.)

Of 1,775 families reporting the purchase of potatoes, 37 percent made personal selections, and the proportion was higher in the low income group, declining as the weekly income. Consumers with low income are likely to be more careful buyers and less willing to accept some waste in the package. Furthermore, they often bought potatoes at lower prices and probably made choices from lots in which selection was more important because of the larger proportion of small-size or damaged potatoes present. Stores better equipped to satisfy the preferences of their higher-income customers were better able to provide selection, and selling at higher prices they made a more careful selection for their customers.

When classified on the basis of size of family, as in table 50, consumer preferences, as reflected in personal selections, were practiced by a larger percentage of small than of large families. Small families were more likely to buy a few potatoes at a purchase for some particular use than were large families in which the use of potatoes, as previously shown, was greater. The wide adoption of the 15-pound package also had an influence on the consumers' selection. These packages were more easily purchased from stock than smaller packages likely to be put up at the time of purchase. Large families buying the larger packages were more likely to buy them already prepared for sale, both because they were easier to purchase that way and because the large families using more potatoes were less likely to find it necessary to waste them if a variety of sizes were included.

TABLE 50.—Families making personal selection of potato purchases, by size of family groups, Boston, Mar. 4 to Apr. 6, 1940

Persons in family	Total families reporting	Families making personal selection	
		Total	Percentage of families in group
		Number	Percent
1	40	19	47.5
2	362	156	43.1
3	381	144	37.8
4	381	124	32.5
5	268	100	37.3
6	149	48	32.2
7 or more	194	65	33.5
Total	1,775	656	37.0

Since the average size of packages purchased in June was smaller than in March, it would be expected that consumer selection would have been practiced more frequently. There was a difference between

TABLE 51.—Families making personal selection of potato purchases, by income groups, Boston, June 1940

Family income per week	Old potatoes			New potatoes		
	Total families reporting	Families making personal selection		Total families reporting	Families making personal selection	
		Total	Percentage of families in group		Total	Percentage of families in group
	Number	Number	Percent	Number	Number	Percent
\$15 or less.....	75	18	24.0	24	3	12.5
\$16-\$25.....	162	52	32.1	117	43	36.8
\$26-\$35.....	219	70	32.0	198	74	37.4
\$36-\$45.....	180	41	22.8	183	75	41.0
\$46-\$55.....	79	22	27.8	93	34	36.6
\$56 or more.....	48	11	22.9	73	29	39.7
Total.....	763	214	28.0	688	258	37.5

new and old potatoes, as shown in table 51, where it is indicated that only 28 percent of the consumers personally selected old potatoes in that month, whereas 37.5 percent made personal selections of new potatoes. The percentage of personal selection was not increased by the selection of a larger percentage of small packages. There was no apparent trend in the likelihood of personal selection associated with income in the data for June. When classified on the basis of size of family, however, the tendency for the larger proportion of personal selection to be made by small families, as indicated in March, was still present (table 52).

These data indicated the need for reviewing the grading and packaging procedure for potatoes to determine the possibility of making purchasing easier through the process of more careful elimination of defects, and more care in selecting the contents of the package as to

TABLE 52.—Families making personal selection of potato purchases, by size of family groups, Boston, June 1940

Persons in family	Old potatoes			New potatoes		
	Total families reporting	Families making personal selection		Total families reporting	Families making personal selection	
		Total	Percentage of families in group		Total	Percentage of families in group
	Number	Number	Percent	Number	Number	Percent
1.....	42	21	50.0	10	7	70.0
2.....	158	54	34.2	138	57	41.3
3.....	179	58	32.4	179	62	34.6
4.....	137	41	29.9	127	48	37.8
5.....	96	24	25.0	102	36	35.3
6.....	72	16	22.2	63	26	41.3
7 or more.....	79	10	12.6	69	22	31.9
Total.....	763	214	28.0	688	258	37.5

size, and more careful marking of the package to indicate the character of the contents. The possibility of providing consumers with some of these services should be studied in connection with the costs likely to be incurred. Some marketing organizations have gone to considerable length in providing consumers with the most desirable services in connection with the products which they sell. Selling a specific brand and quality already packaged has become a trend in marketing, and the producer group or marketing agency which lags in this trend is likely to be at a disadvantage.

Preferences for Size

Enumerators asked consumers what size of potatoes they considered most desirable for different cooking uses. To get answers as accurate as possible, the consumer was asked to select the particular size most desired from those included in her last purchase, and the potato so selected was measured. In table 53 the results of this enumeration are shown for two sample groups in March and four sample groups in June.

Responses from consumers rarely indicated that a potato smaller than 2 inches was desirable for any cooking use. On occasion, a very small proportion of them indicated a preference for small potatoes for stewing with other vegetables, but mostly a potato larger than 2 inches was desired. At the same time, consumers rarely indicated a preference for potatoes larger than 3 inches in diameter although the larger sizes were not as objectionable as the small ones. The replies, therefore, were tabulated as relating to those under 2½ inches and those 2½ inches or over. Table 53 shows that for all reported methods of

TABLE 53.—Families specifying size and cooking use preferences as related to the total number reporting use of potatoes, by sampling-period groups, Boston, Mar. 4 to Apr. 6, and June 1940

Sampling period	Crop	Families reporting use of potatoes	Percentage of families specifying—							
			Baking		Boiling		Frying		French frying	
			Under 2½ inches	2½ inches and over	Under 2½ inches	2½ inches and over	Under 2½ inches	2½ inches and over	Under 2½ inches	2½ inches and over
		<i>Number</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Mar. 4–Mar. 23	(1)	879	12.5	53.4	18.2	37.0	14.8	35.4	12.8	34.8
Mar. 25–Apr. 6	(1)	896	8.1	71.4	19.9	52.9	16.3	45.3	13.4	51.7
June 1–June 15	Old	508	4.1	60.8	8.5	44.5	4.7	33.7	3.0	35.8
June 1–June 15	New	246	6.5	57.3	13.0	50.8	6.9	39.4	6.5	41.0
June 17–June 29	Old	260	.8	70.0	2.7	46.9	.8	33.8	1.2	35.4
June 17–June 29	New	437	1.6	71.2	4.3	60.4	3.2	47.4	1.8	47.6
Total		3,226	7.1	63.6	13.6	47.6	10.3	39.7	8.5	41.9

¹ March and April data refer only to old potatoes.

preparation, potatoes 2½ inches or over were desired by a larger proportion of the reporting families than any other size. It also shows that this was true both in March and in June.

Potatoes were not available for measuring in every household; therefore, the percentage of consumers reporting preferences was smaller than the total number of those reporting use of potatoes. In other cases, consumers did not express a preference, indicating that preference was not very emphatic. On this basis, table 53 shows that the preference for size for baking potatoes was more important than for any other method of preparation, because a larger percentage of the families reported size preferences for baking than for any other method of preparation.

When classified according to the number of persons in the family (table 54), the data on preferences for size in baking show that the percentage of families preferring potatoes 2½ inches or over was greater for small families than for large ones. This tendency for change in size preference, as related to use, does not show up for any of the other methods of preparation. It indicates again that the preference for size in baking potatoes is stronger than for any other method of preparation.

TABLE 54.—Families specifying size and cooking use preferences as related to the total number reporting use of potatoes, by size of family groups, Boston, Mar. 4 to Apr. 6, and June 1940

Persons in family	Families reporting use of potatoes	Percentage of families specifying—							
		Baking		Boiling		Frying		French frying	
		Under 2½ inches	2½ inches and over	Under 2½ inches	2½ inches and over	Under 2½ inches	2½ inches and over	Under 2½ inches	2½ inches and over
	<i>Number</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
1.....	90	6.7	77.8	4.4	38.9	3.3	33.3	3.3	30.0
2.....	659	5.3	62.8	12.3	45.4	9.9	38.8	8.0	39.3
3.....	736	8.4	68.1	14.1	52.2	11.1	42.9	9.0	44.2
4.....	644	6.8	64.4	13.8	48.4	10.7	41.1	8.8	43.3
5.....	488	6.2	64.1	13.2	49.6	9.6	42.5	7.9	47.9
6.....	285	8.1	64.2	16.8	49.5	11.9	39.6	9.8	44.6
7 or more.....	344	8.7	49.1	14.8	38.7	10.2	29.4	9.0	32.3
Total.....	3,226	7.1	63.6	13.6	47.6	10.3	39.7	8.5	41.9

The reason why large families are more likely to prefer baking potatoes averaging smaller in size is more difficult to explain. It may have an income association, based again on the fact that income per person declines as the number of persons per family increases. This suggestion receives added support from table 55, which shows the same families classified according to weekly family income. Here again the fact that a changing size preference is associated only with baking potatoes becomes evident. It may indicate an attempt to get one potato per person at as low a cost as possible. These data

TABLE 55.—Families specifying size and cooking use preferences as related to the total number reporting use of potatoes, by income groups, Boston, Mar. 4 to Apr. 6, and June 1940

Family income per week	Families reporting use of potatoes	Percentage of families specifying—							
		Baking		Boiling		Frying		French frying	
		Under 2½ inches	2½ inches and over	Under 2½ inches	2½ inches and over	Under 2½ inches	2½ inches and over	Under 2½ inches	2½ inches and over
	<i>Number</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
\$15 or less	268	11.9	54.8	16.0	44.8	13.8	39.2	11.2	39.2
\$16-\$25	696	5.7	63.5	12.2	49.6	10.3	44.5	7.8	47.4
\$26-\$35	963	5.1	59.6	12.0	44.6	9.8	36.8	8.1	40.9
\$36-\$45	692	8.1	63.2	12.9	47.5	8.8	37.4	7.8	38.3
\$46-\$55	375	10.1	73.1	20.0	49.3	13.6	38.7	11.5	41.1
\$56 or more	232	6.0	76.7	13.4	54.7	7.8	46.1	6.9	44.8
Total	3,226	7.1	63.6	13.6	47.6	10.3	39.7	8.5	41.9

also show that the proportion of families preferring potatoes 2½ inches or over increased as the family income increased.

These family reports on preference according to size are probably of considerable importance to the producers of potatoes. They show, for instance, that potatoes should be carefully sized for the consumers' use. They show that for most families potatoes under 2½ inches were likely to be less desirable for any cooking use than potatoes from 2½ to 3 inches. They also show that a small proportion of each population group preferred potatoes slightly under 2½ inches.

In ordinary commercial practice at the present time, or at least during the period when these data were gathered, it was not customary to size potatoes in this way. (Fig. 19.) The conclusion, therefore, is

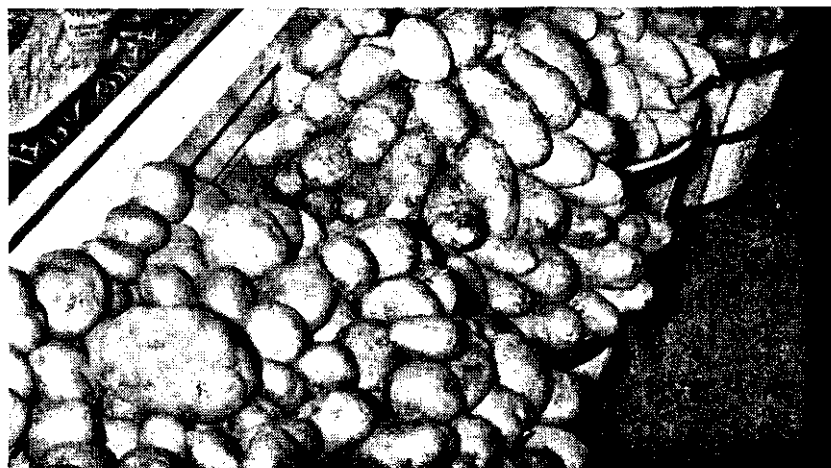


FIGURE 19.—Potato display in a retail store. The lot on the left includes a wide variety of sizes. The Idaho potatoes, next on the right, have been sized much more carefully.

that the only way consumers could get potatoes sized according to their preferences was to resort to the practice of picking out the sizes they personally desired from bulk lots displayed in retail stores. In this manner only, they could avoid purchasing potatoes that were too small or too large to suit their preferences.

Preferences for Potato Appearance

Data tabulated only for March showed very definite preferences based on appearance. The strongest of these was for uniform size. Over 70 percent of the consumers (table 56) interviewed in March pointed out this fact and the preference became stronger as the weekly family income increased.

TABLE 56.—*Families specifying potato appearance preferences as related to the total number reporting use of potatoes, by income groups, Boston, Mar. 4 to Apr. 6, 1940*

Family income per week	Families reporting use of potatoes	Percentage of families specifying—				
		Uniform	Clean	Smooth	Shallow eyed	Bright
	<i>Number</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
\$15 or less	170	62.4	39.4	42.9	11.8	10.0
\$16-\$25	416	68.0	37.5	48.8	21.6	14.4
\$26-\$35	546	72.7	41.0	41.8	26.6	26.4
\$36-\$45	325	72.6	33.2	36.9	21.8	24.3
\$46-\$55	208	74.0	50.0	44.7	26.4	27.9
\$56 or more	110	81.8	56.4	45.4	20.9	30.0
Total	1,775	71.3	40.6	43.2	22.8	22.0

These data, showing generally stronger appearance preferences associated with higher incomes, point to the need for taking these preferences into account if an attempt is made to sell for higher than average prices. Families with incomes sufficient to pay such prices most frequently expressed the particular preferences.

Preferences for Cooking Quality

An attempt was made to get some indication of the cooking-quality characteristics which seemed important to the consumers. These data were much less precise than those previously presented with reference to consumers' preference because of the inability to get precise measurements. The strong preference shown in these responses for mealy potatoes (table 57) probably was associated with the consumers' desire for potatoes for baking.

TABLE 57.—Families specifying cooking quality preferences as related to the total number reporting use of potatoes, by income groups, Boston, Mar. 4 to Apr. 6, 1940

Family income per week	Families reporting use of potatoes	Percentage of families specifying—				
		Dry	Moist	Mealy	White cooking	Even texture
	<i>Number</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
\$15 or less.....	170	32.9	7.6	60.0	41.2	15.3
\$16-\$25.....	416	34.4	8.9	66.3	39.2	9.4
\$26-\$35.....	546	41.8	9.0	64.0	34.1	10.3
\$36-\$45.....	325	48.9	4.6	61.5	41.2	13.2
\$46-\$55.....	208	49.0	5.8	71.6	42.8	13.5
\$56 or more.....	110	50.0	0.9	81.8	49.1	20.0
Total.....	1,775	41.9	7.2	65.7	39.2	12.0

PRICES PAID FOR POTATOES BY BOSTON CONSUMERS

PRODUCERS, in determining what additional services should be included in their marketing program, must usually decide whether consumers prize these services highly enough to pay for their additional cost. In marketing it may be assumed that unless the purchaser wants the service bad enough to pay for its additional cost its provision is not justified. If Maine potato growers spend more time and money in grading their product, diverting more of the product to byproduct uses, they feel that prices should be sufficient to justify the increased expense of packing and selling and to offset the loss in potatoes discarded.

The assumption that retail prices should be sufficiently high to pay the entire cost of the services is not entirely justifiable. Other savings are likely to accompany a program directed toward the improvement of consumer demand. If, for instance, the cooperative marketing association provides a better package from the consumer's point of view, appreciation of this fact is likely to direct demand toward this package, and make selling easier. The lower cost of selling will partly offset the cost of improving the product. Following from the decrease in cost of selling is the fact that the more efficient association will gain volume. Prices may be slightly advanced and selling costs will again be decreased because of this increased demand. Retail prices, therefore, need not be advanced by an amount sufficient to pay all the cost of the new program, because in the long run, these methods of operation entail savings as well as costs.

Wholesale Prices in March, May, and June 1940

Since so many retailers serving Boston consumers bought their supplies in the local wholesale market, wholesale prices should give some indication of changes in prices. In table 58 are prices of the

TABLE 58.—Wholesale prices of U. S. No. 1 Maine potatoes in 100-pound bags at Boston, by varieties, for specific days during March, May, and June 1940¹

(Price per 100 pounds)

Date	Green Mountain		Chippewa		Katahdin	
	Size A	2-inch minimum	Size A	2-inch minimum	Size A	2-inch minimum
	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>
Mar. 1	1.70-1.80		1.80-1.90		1.75-1.85	1.85-2.00
5	1.70-1.80		1.80-1.90		1.75-1.85	1.80-1.90
8	1.75-1.80		1.80-1.90			1.80-2.00
12	1.75-1.85		1.85-1.90			1.90-2.00
15	1.85-1.95			1.90-2.00		1.90-2.00
19		1.90-2.00		1.95-2.00		1.95-2.00
22	1.85-1.90	1.90-2.00		1.95-2.00		1.95-2.00
26	1.85-1.90	1.90-2.00		2.00-2.10		2.00-2.10
29	1.85-1.90	2.00-2.10		2.00-2.10		2.00-2.10
May 17	1.80-1.90	1.90-2.00		2.00-2.10		2.00-2.10
21	1.85-1.90	2.00-2.00		2.00-2.10		2.00-2.10
24	2.00	2.00-2.10		2.10-2.15		2.10-2.15
28	2.25-2.35	2.35-2.40		2.35-2.50		2.35-2.50
31	2.25-2.35	2.35-2.40		2.35-2.50		2.35-2.50
June 4	2.25-2.35	2.35-2.50		2.35-2.50		2.35-2.50
7	2.25-2.35	2.25-2.40		2.35-2.40		2.35-2.40
11	2.00-2.10	2.10-2.25	2.00-2.10	2.25-2.40	2.00-2.10	2.25-2.40
14	2.00-2.15	2.10-2.25	2.00-2.15	2.25-2.35	2.00-2.10	2.25-2.35
18		2.00-2.15		2.25-2.30	2.10	2.25-2.30
21				2.00-2.10		2.00-2.10
25				1.85-2.00		1.85-2.00
27				1.75-1.85		1.75-1.85

¹ Miscellaneous Fruit and Vegetable Reports, U. S. Dept. of Agr., Agricultural Marketing Service, 408 Atlantic Ave., Boston, Mass. (Mimeographed.) Sales until 10 a. m. on wholesale market in less than carlot quantities. These reports also give wholesale prices on U. S. Commercials, Maine Utilities, and occasionally on Maine Culls.

To meet the requirements for size A, for round- or intermediate-shaped varieties, as given in U. S. Standards for Potatoes, the diameter of each potato shall be not less than $1\frac{3}{8}$ inches and not less than 60 percent of the potatoes in the lot shall be $2\frac{1}{4}$ inches or larger in diameter.

The 2-inch minimum standard is a size classification sometimes used by potato shippers and other members of the trade in which the number of potatoes less than 2 inches in diameter shall not exceed the tolerance for undersized potatoes.

three principal varieties of Maine potatoes for each Tuesday and Friday in March, in the last half of May, and in June 1940. The quotations shown are for "best" stock. Intermittently, prices were quoted for "fair" or "ordinary" stock at varying differentials under "best."

Throughout the period indicated, the quoted wholesale price of Green Mountains was slightly lower than the price of Chippewas and Katahdins. Generally speaking, the quotations for the latter two varieties were alike. Irrespective of variety, however, prices advanced slightly in March. From the middle to the end of May, a much sharper advance took place. Prices were maintained at the higher level during the first week in June but receded later.

The first "new" potatoes for which quotations were published in 1940 were California Long White. The quotation appeared on April 15. The price was \$2 for a 50-pound burlap bag or 4 cents a pound wholesale. A week later, prices were quoted on Chippewas from Florida at \$1.35 to \$1.40 per bushel basket, or $2\frac{1}{4}$ to $2\frac{3}{8}$ cents per pound wholesale. On the same day California Long Whites were selling at about $3\frac{1}{2}$ cents per pound. Table 59 shows that usually

Long Whites were quoted at prices about the same as Florida Katahdins and higher than Cobblers.

The seasonal shift in the source of supply as well as the different kinds of containers used in shipping new potatoes are indicated in table 59. This table also shows that both washed and unwashed potatoes were being sold at substantial differentials in price. The fact that quotations were given not only for "best," but also occasionally for "fair" and "ordinary" stock supports the assumption that considerable range in quality was represented. However, the prices of new potatoes declined sharply from the last part of May to the end of June. Consumers who bought new potatoes in the latter part of May and the first week of June paid considerably more than those who bought old potatoes. However, this price difference became smaller as the supply of new potatoes increased so that, by the end of June, new potatoes and the remaining supply of old potatoes from Maine were selling at substantially the same price.

TABLE 59.—Wholesale prices per 100 pounds of U. S. No. 1 new potatoes at Boston, by origin, variety, and kind of container, for specified days during May and June 1940¹

Date	Florida Katahdins in bushel baskets	California Long Whites in 50-pound sacks	Alabama Long Whites in 50-pound sacks	South Carolina Cobblers in 100-pound sacks	North Carolina Cobblers in 100-pound sacks	Eastern Shore Virginia Cobblers in barrels	Norfolk Cobblers in barrels
	Dollars per 100 pounds	Dollars per 100 pounds	Dollars per 100 pounds	Dollars per 100 pounds	Dollars per 100 pounds	Dollars per 100 pounds	Dollars per 100 pounds
May 17	2.08-2.25	2.50-2.60					
21	2.25-2.75	2.70					
24	2.67-2.92	2.80					
28	3.17		3.30	2.65-2.75			
31	2.75-3.17		3.30	2.60-2.90			
June 4	2.92-3.33			2.60-2.75			
7	2.67-3.17	2.80-3.00	2.75-3.20	2.25-2.40	2.25-2.40		
11	2.50-3.08	2.50-2.80	2.80	² 1.75-1.85	² 1.75-1.85		
14	2.25-2.92	2.30-2.50	2.70	² 1.50-1.75	² 1.75-1.85	² 2.27	
18		2.50	2.30-2.70		² 1.65-1.75	² 2.12	
21			2.60-2.70		² 1.75-1.85	² 1.97-2.06	² 1.82
25			2.60-2.70		² 1.65-1.75	² 1.82	² 1.73
28		3.00	2.60-2.70		² 1.65-1.75	² 1.67-1.73	

¹ Miscellaneous Fruit and Vegetable Reports, U. S. Dept. of Agr., Agricultural Marketing Service, 108 Atlantic Avenue, Boston, Mass. (Mimeographed.) Sales until 10:00 a. m. on wholesale market in less than carlot quantities. Prices given are quotations converted to a hundred-pound basis to facilitate comparisons.

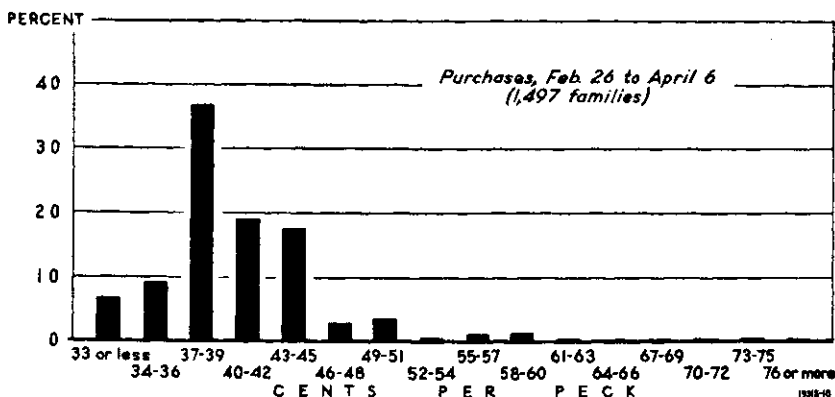
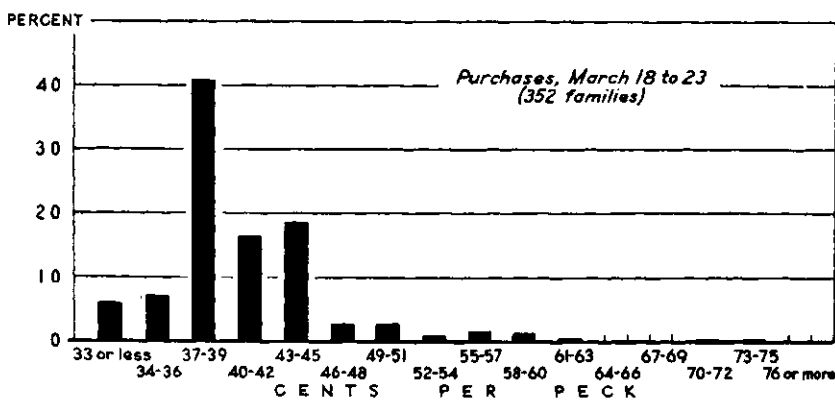
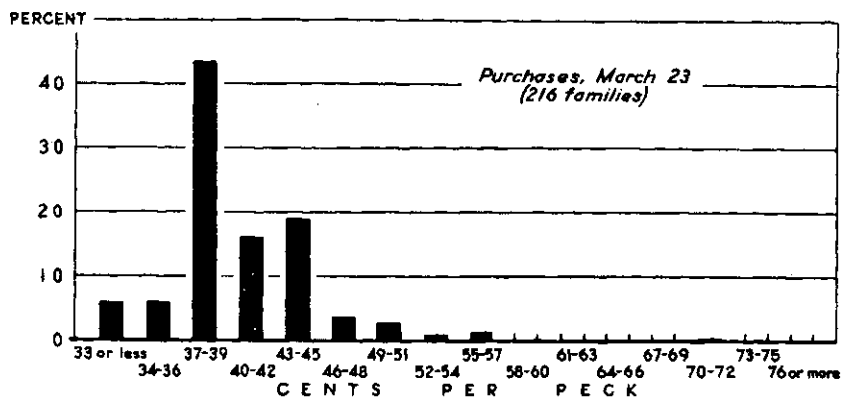
² Unwashed. All other prices are for "best" quality, washed potatoes.

Potato Purchases by Boston Consumers

The retail price data from Boston consumers were summarized in weekly periods because prices were changing at the time the data were being gathered. Tests of significance indicated that reports during the weekly periods were probably representative of the total sample insofar as they represented the same proportions of income, nationality, and size-of-family groups. To this extent, then, within the range of

sampling allowances, changes in weekly averages would indicate the changes in average prices to consumers.

FIGURE 20.--DAILY, WEEKLY, AND TOTAL PERCENTAGE DISTRIBUTION OF ALL PURCHASES OF MAINE POTATOES AT VARIOUS PRICES PER PECK, FOR VARIOUS TIME PERIODS, BOSTON, MARCH 1940.



The Range in Prices for March 23 Was Practically as Wide as That of the Period February 26 to April 6.

On first inspection of the data, it became apparent that the range in prices was very wide. This indicated the likelihood that many consumers were paying higher prices for potatoes of more satisfactory quality since many of the packages were purchased at prices considerably higher than the average for the market. At first, it was thought that this wide range in prices was the result of changing price levels during the period, but on examining these data for individual days, it was found that the range in prices for a given day was practically as large as that for the whole period. Figure 20, for instance, shows in three sections the range in prices reported by Boston consumers for Saturday, March 23; for the week of March 18 to March 23; and for the entire sampling period of February 26 to April 6. It will be noted that on the basis of percentage distribution of the number of packages purchased at various prices, these three diagrams show no important difference.

In June, it will be recalled, prices were changing more rapidly than in March. Figure 21 shows the same sort of distribution for Maine potato prices in June as was shown in figure 22 for March. Here it will be noted that distribution of consumer purchases on June 8 showed much the same range as that of all purchases for the week of June 3 to June 8 and was not materially different from the distribution of the total purchases for the sampling period from May 27 to June 29.

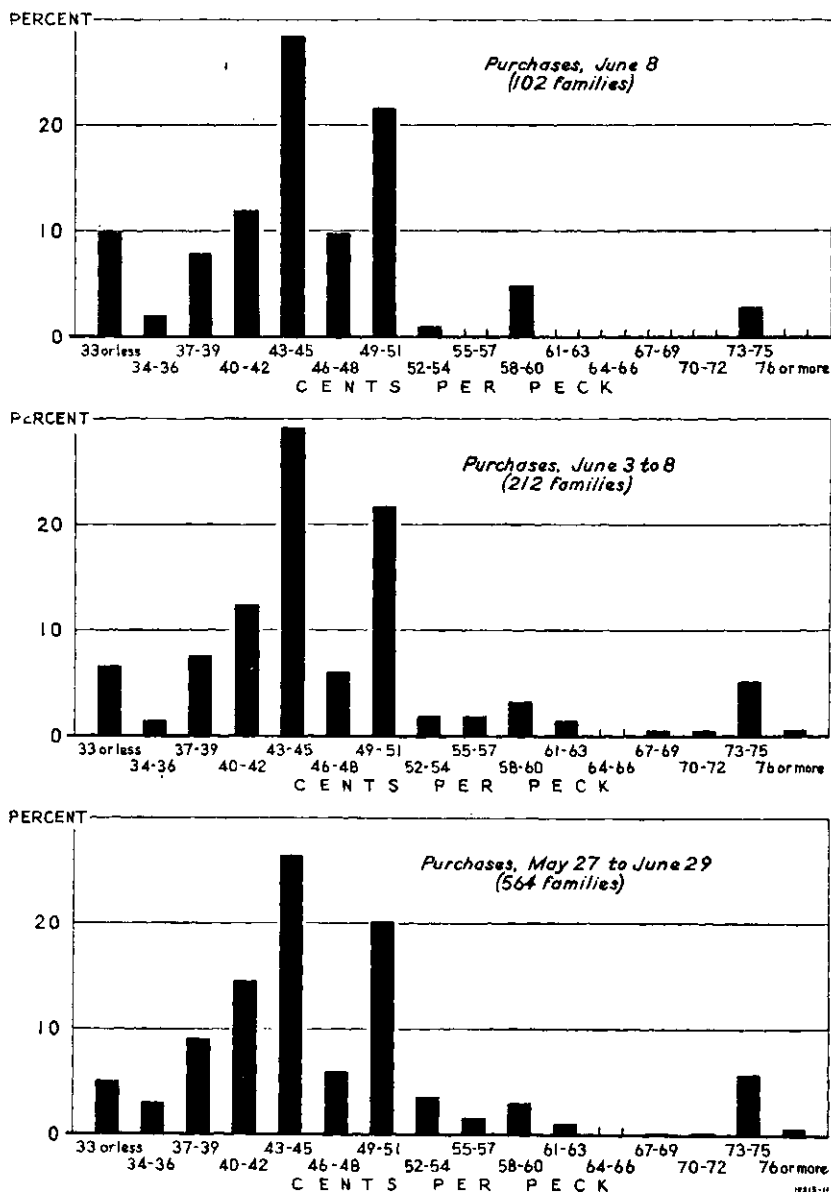
For new potatoes in June, the distribution of prices is shown in figure 22. The range of prices on June 22 was about the same as that for June 17 to June 22, and about the same as that for purchases for the entire sampling period, May 27 to June 29. However, there is a difference in these distribution diagrams in that they show a larger proportion of high-price purchases in the longer period. Prices were falling rapidly through the month of June, and the data for the

TABLE 60.—Daily, weekly, and total price ranges per peck for purchases of old and new potatoes, by kind of package, Feb. 26 to Apr. 6 and May 27 to June 29, 1940, Boston, Mass.

Crop and time period	Number of purchases	Price ranges per peck for—			
		Less than pecks	Branded pecks	Unbranded pecks	More than pecks ¹
Old potatoes:	<i>Number</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>
Mar. 23.....	216	37-70	27-45	25-49	37
Mar. 18 to 23.....	352	25-73	25-49	25-59	37
Feb. 26 to Apr. 6.....	1,497	25-93	25-49	25-59	25-43
June 8.....	102	29-75	41-51	25-51	18
June 3 to 8.....	212	20-100	41-51	25-57	18-45
May 27 to June 29.....	564	20-100	35-59	25-59	18-51
New potatoes:					
June 22.....	89	29-75	35	31-57	39
June 17 to 22.....	196	29-77	35	29-71	39
May 27 to June 29.....	623	29-110	35-59	25-75	29-59

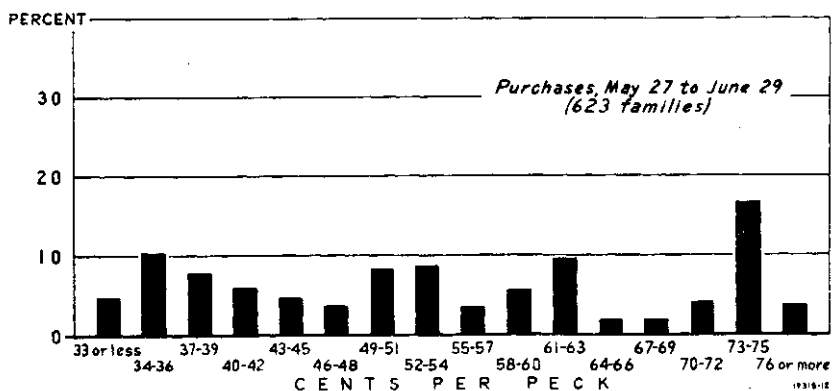
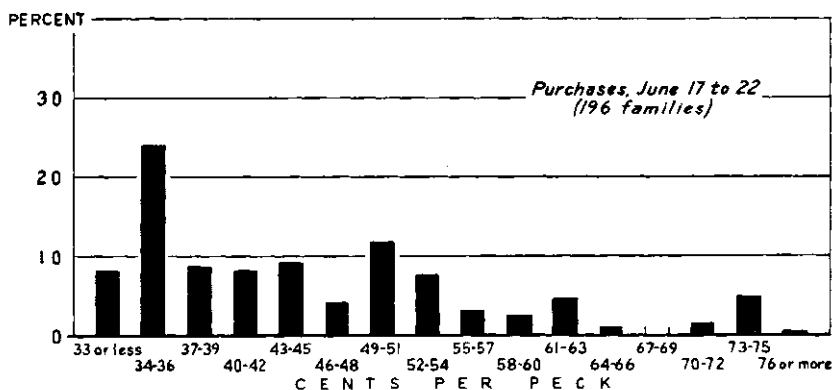
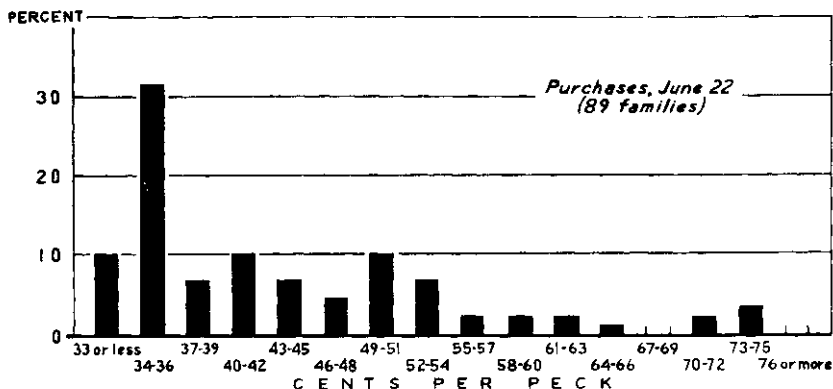
¹ Represents only 37 purchases (Feb. 26 to Apr. 6), 9 purchases of old, and 5 purchases of new potatoes (May 26 to June 29).

FIGURE 21.—DAILY, WEEKLY, AND TOTAL PERCENTAGE DISTRIBUTION OF ALL PURCHASES OF MAINE POTATOES AT VARIOUS PRICES PER PECK, FOR VARIOUS TIME PERIODS, BOSTON, JUNE 1940.



The Range in Prices for June 8 as Practically Was Wide as That for the Period May 27 to June 29.

FIGURE 22.—DAILY, WEEKLY, AND TOTAL PERCENTAGE DISTRIBUTION OF ALL PURCHASES OF NEW POTATOES AT VARIOUS PRICES PER PECK, FOR VARIOUS TIME PERIODS, BOSTON, JUNE 1940.



The Range in Prices for June 22 Was Practically as Wide as That of the Period May 27 to June 29.

period from May 27 to June 17 included a large proportion of high prices. The important thing for our consideration, however, is the fact that the range was not materially changed. The data in figures 20, 21, and 22 are supplemented by those in table 60, which shows the range in prices by types of packages and by days and periods. This shows that for any type of package as well as for any day and any time period, there was a wide range in prices.

The importance of these data lies in the fact that they indicate the wide range in prices that Boston consumers were paying for potatoes, and suggests that these consumers were attempting to satisfy certain preferences for quality, type of package, or services. It indicates that there was a group of consumers in Boston who would pay higher prices, provided the desirable characteristics were present.

On the other hand, these data show another price relationship; a considerable bulking of the purchases at the lower end of the price range. This tendency suggests that a large proportion of the consumers considered price one of the significant characteristics of the article purchased, and that price itself must, therefore, be considered as one of the important characteristics of the consumer package for this group of buyers. It suggests that for a large proportion of the volume sold, prices cannot be raised very much.

The conclusion, therefore, is that a group of producers wishing to embark on a quality program with a brand, a trade-mark, and advertising cannot hope to sell a large proportion of their product at prices significantly above the average for the market, but must also rely on the efficiencies which go with greater volume of sales to pay for part of the increased cost of their merchandising program.

Prices in Different Weeks as Related to Package

The average prices paid by consumers for potatoes in different weeks are shown in table 61. Prices for all types of packages advanced during March but those for small bulk packages and for branded peck packages advanced the most. In June the advancing prices for Maine potatoes continued but prices for new potatoes declined. As a result of these opposite trends, prices of new potatoes, as measured by averages, were lower after the middle of June than those for old Maine potatoes.

In March prices of branded pecks advanced faster than prices of pecks packed from bulk in the retail stores²⁴. During the week of February 26 to March 2, the differential was about 2 cents per peck. At the end of March it had widened to about 2.7 cents per peck.

²⁴ Foelsch, G. G. Marketing Maine Potatoes: A Preliminary Report of Boston Retail Prices as Associated with Types of Packages, Retailers, and Consumers Incomes, February 26 to April 6, 1940. F. C. A. Misc. Report 36, 32 pp. 1941. (Processed.)

TABLE 61.—Average prices per peck of old and new potatoes by kind of package and week of purchase, March and June 1940, Boston, Mass.

Crop and week	Total purchases	Average price per peck				Average all packages
		Less than pecks	Branded pecks	Unbranded pecks	More than pecks	
Old potatoes:	Number	Cents	Cents	Cents	Cents	Cents
Feb. 26-Mar. 2.....	142	41.1	39.1	37.1	(1)	38.7
Mar. 4-9.....	299	40.9	39.8	37.9	(1)	39.2
11-16.....	316	42.1	39.7	38.5	(1)	39.6
18-23.....	352	43.4	40.1	38.2	(1)	40.3
25-30.....	336	43.9	42.0	39.3	(1)	41.3
Apr. 1-6.....	52	(1)	(1)	(1)	(1)	(1)
Total or average.....	1,497	42.6	40.4	38.4	36.4	40.1
May 27-June 1.....	142	48.4	44.8	41.9	(1)	44.8
June 3-8.....	212	50.6	46.0	42.4	(1)	46.7
10-15.....	150	51.0	45.3	43.6	(1)	47.8
17-22.....	50	(1)	(1)	(1)	(1)	(1)
24-29.....	10	(1)	(1)	(1)	(1)	(1)
Total or average.....	564	50.3	45.5	42.5	36.1	46.5
New potatoes:						
May 27-June 1.....	57	(1)	(1)	(1)	(1)	(1)
June 3-8.....	107	67.0	(1)	56.6	(1)	64.8
10-15.....	218	61.2	(1)	47.2	(1)	57.0
17-22.....	196	50.3	(1)	38.2	(1)	45.4
24-29.....	45	(1)	(1)	(1)	(1)	(1)
Total or average.....	623	59.2	42.5	44.7	41.6	54.8

(1) Too few purchases to average.

This widening of the differential caused some consumers to shift their purchases from branded to unbranded pecks during March.

Size of Consumers' Purchases in March and in June

When prices and qualities in consumer packages were relatively stable, consumers purchased larger packages than when qualities were unstable and prices were changing. Table 62 shows that in March, when prices were relatively stable, branded peck packages were purchased by 23 percent of the consumers reporting, and unbranded peck packages by 44.3 percent. In March also, 2.4 percent

TABLE 62.—Changes in percentage of purchases of old and new potatoes by kind of package at different time periods in 1940, Boston, Mass.

Crop and period	Total purchases	Percentage of purchases by kind of package				Total
		Less than pecks	Branded pecks	Unbranded pecks	More than pecks	
Old potatoes:	Number	Percent	Percent	Percent	Percent	Percent
Feb. 26-Apr. 6.....	1,497	30.3	23.0	44.3	2.4	100.0
May 27-June 29.....	564	46.3	17.2	34.9	1.6	100.0
New potatoes:						
May 27-June 29.....	623	69.8	.7	28.7	.8	100.0
June 3-8.....	107	80.4	.9	18.7	—	100.0
10-15.....	218	70.6	.5	27.1	1.8	100.0
17-22.....	196	58.2	1.0	40.3	.5	100.0

of the consumers purchased more than a peck and about 30 percent less than a peck. In June, 46.3 percent of the consumers purchasing old potatoes and 69.8 percent of those purchasing new potatoes bought less than a peck at a time.

Only 17.2 percent in June used branded packages. New potatoes were rarely sold in branded packages. The percentage of consumers purchasing lots of a peck or more was much lower in June than in March. These data would indicate that the development of a merchandising program on the basis of branded peck packages alone might have serious drawbacks in those seasons of the year when qualities are unstable, or at any time when prices were falling.

Family Income and Kind of Package Purchased

Although potatoes in less-than-peck packages cost more per peck than either branded or unbranded pecks, families in the lower income groups were likely to buy in small quantities. This may be partly because many low-income families were small and also partly because their day-to-day expenditures had to be small. This tendency for families with low incomes to purchase at higher prices per peck was found in data for March and was increasingly evident in June, as shown in table 63. Although branded pecks were more costly than

TABLE 63.—Percentage of purchases of old and new potatoes, by kind of package and by family income, Boston, Mass., March and June 1940

Crop purchased and family income per week	Total purchases	Percentage of purchases				Total
		Less than pecks	Branded pecks	Unbranded pecks	More than pecks	
Old potatoes (Feb. 26-Apr. 6):	<i>Number</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
\$15 or less	138	40.6	13.0	43.5	2.9	100.0
\$16-\$25	378	31.7	18.8	46.6	2.9	100.0
\$26-\$35	456	23.0	26.3	49.1	1.6	100.0
\$36-\$45	266	27.5	24.8	44.0	3.7	100.0
\$46-\$55	166	35.5	24.7	38.0	1.8	100.0
\$56 or more	93	43.0	30.1	24.7	2.2	100.0
Total or average	1,497	30.2	23.0	44.3	2.5	100.0
Old potatoes (May 27-June 29):						
\$15 or less	67	73.1		23.9	3.0	100.0
\$16-\$25	123	58.5	11.4	28.5	1.6	100.0
\$26-\$35	171	44.4	18.7	36.3	.8	100.0
\$36-\$45	127	33.9	22.0	42.5	1.6	100.0
\$46-\$55	49	22.4	32.7	40.8	4.1	100.0
\$56 or more	27	37.0	26.0	37.0		100.0
Total or average	564	46.3	17.2	34.9	1.6	100.0
New potatoes (May 27-June 29):						
\$15 or less	21	76.2		19.0	4.8	100.0
\$16-\$25	112	76.8		23.2		100.0
\$26-\$35	178	64.6	.6	33.7	1.1	100.0
\$36-\$45	107	73.7	1.8	24.5		100.0
\$46-\$55	80	66.2		32.5	1.3	100.0
\$56 or more	65	64.6		33.9	1.5	100.0
Total or average	623	69.8	.7	28.7	.8	100.0

TABLE 64.—Where Boston families bought potatoes and average price paid per peck, by crop and by kind of package, Feb. 26 to Apr. 6 and May 27 to June 29, 1940

Crop and kind of package	Total purchases	Percentage of packages bought from—				Total	Average prices paid at—				Average price, all sources
		Large chain groups	Other chain groups	Independent stores	Hucksters		Large chain groups	Other chain groups	Independent stores	Hucksters	
	Number	Percent	Percent	Percent	Percent	Percent	Cents	Cents	Cents	Cents	Cents
Old potatoes (Feb. 26-Apr. 6):											
Less than pecks.....	453	37.5	10.6	37.1	14.8	100.0	41.7	43.1	43.2	43.1	42.6
Branded pecks.....	344	86.4	2.3	11.3	.....	100.0	40.3	41.0	41.1	.....	40.4
Unbranded pecks.....	663	36.6	12.1	38.9	12.4	100.0	37.3	38.4	39.2	39.2	38.4
More than pecks.....	37	32.4	5.4	35.2	27.0	100.0	(1)	(1)	(1)	(1)	36.4
Total or average.....	1,497	48.2	9.2	32.0	10.6	100.0	39.6	40.2	40.7	40.6	40.1
Old potatoes (May 27-June 29):											
Less than pecks.....	261	31.0	5.8	34.1	29.1	100.0	49.8	49.6	50.0	51.2	50.3
Branded pecks.....	97	84.5	5.2	9.3	1.0	100.0	45.3	43.4	48.7	(1)	43.5
Unbranded pecks.....	197	33.5	7.1	39.1	20.3	100.0	42.6	43.4	43.2	40.7	42.5
More than pecks.....	9	33.4	22.2	22.2	22.2	100.0	(1)	(1)	(1)	(1)	36.1
Total or average.....	564	41.1	6.4	31.4	21.1	100.0	46.0	45.4	46.9	47.2	46.5
New potatoes (May 27-June 29):											
Less than pecks.....	435	36.1	9.4	36.8	17.7	100.0	60.2	60.5	59.2	56.4	59.2
Branded pecks.....	4	75.0	.....	25.0	.....	100.0	(1)	.....	(1)	.....	42.5
Unbranded pecks.....	179	36.3	12.8	35.8	15.1	100.0	45.9	42.6	44.9	43.1	44.7
More than pecks.....	5	20.0	40.0	40.0	.....	100.0	(1)	(1)	(1)	.....	41.6
Total or average.....	623	36.3	10.6	36.4	16.7	100.0	55.7	53.5	55.1	53.0	54.8

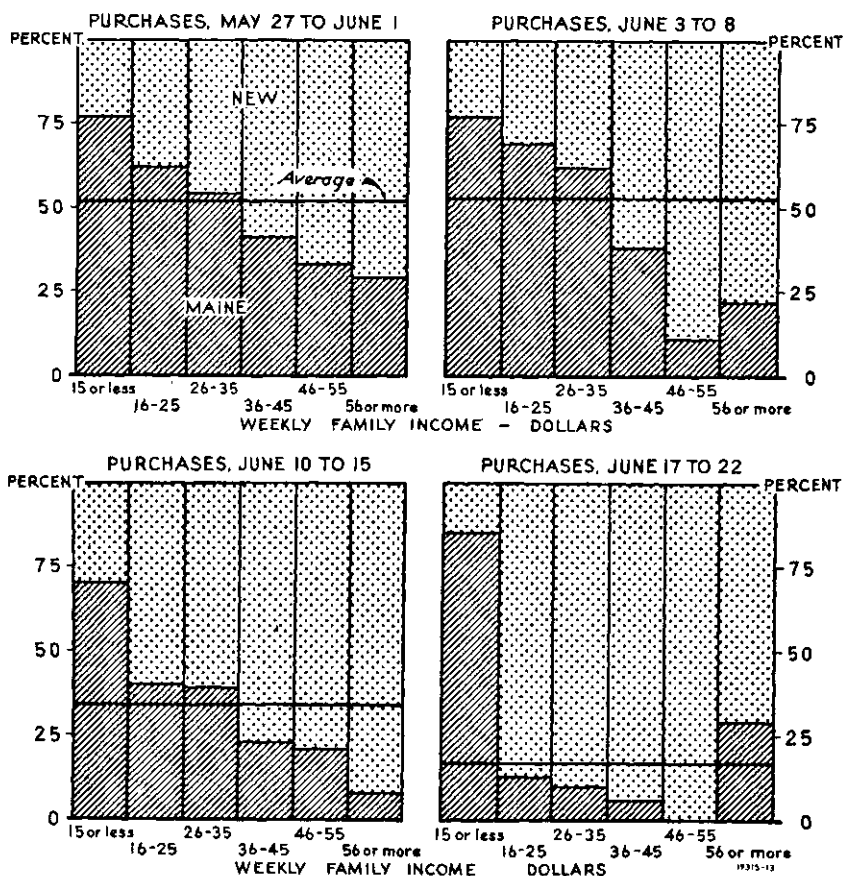
(1) Too few purchases to average.

unbranded ones, some families in all income groups bought them in March. Families with low incomes, buying pecks, were much more likely to buy them unbranded.

Package, Price, and Source of Purchase

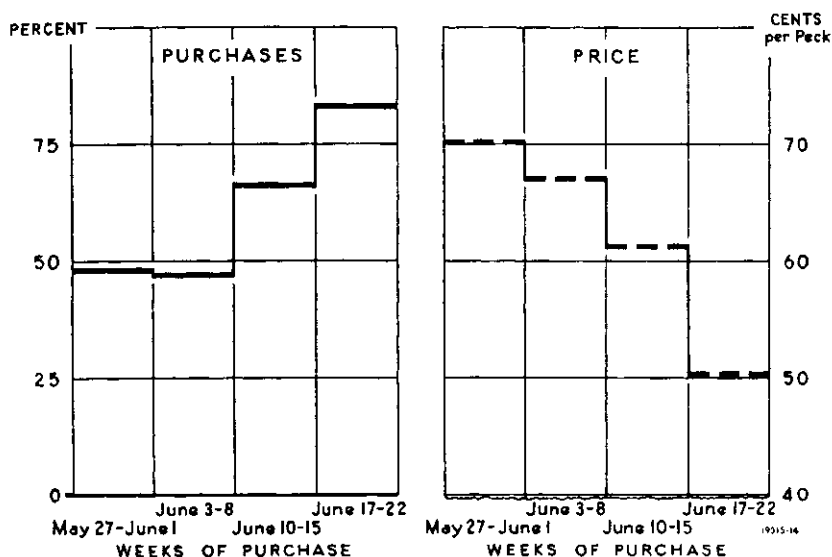
In addition to the size of purchase, the kind of package, and the price paid, consumers were asked where they made their last purchases. These data are summarized in table 64. The consumers indicated four general sources of supply: The large chain store, stores of smaller chain-store groups including retailer associations, independent stores, and hucksters.

FIGURE 23.—PERCENTAGES OF LESS-THAN-PECK PURCHASES OF MAINE AND OF NEW POTATOES, BY WEEKS AND BY INCOME GROUPS, AND FOR TOTAL WEEKLY PURCHASES, MAY 27 TO JUNE 22, 1940.



Families With Lower Incomes Were Buying the Larger Proportion of Old Maine Potatoes in June.

FIGURE 24.—PERCENTAGE OF PURCHASES OF NEW POTATOES AS RELATED TO AVERAGE PRICE, LESS-THAN-PECK PACKAGES, BY WEEKS, BOSTON, MAY 27 TO JUNE 22, 1940.



The Percentage of Families Buying New Potatoes Increased From Week to Week as the Price Decreased.

The data in table 65 show that the large chain stores were by far the most important source of branded consumer packages, both in March and in June. Hucksters were a much more important source of supply for Boston consumers in June than in March, and more important as a source of old than of new potatoes. With reference to price, the most expensive packages were those containing less than a peck.²⁵ For old potatoes, in both March and June, the branded peck package was more expensive than the unbranded package holding a peck or more. There were so few branded peck packages of new potatoes in June as to make the averages unreliable.

The average prices in table 61 show that new potatoes were considerably higher than old potatoes between May 27 and June 15. The series of charts in figure 23 show the way in which reporting consumers shifted their purchases from old to new potatoes. Part of the reason for the change, however, is undoubtedly associated with the limited supply and the poorer quality of the old potatoes available in the market at that time. Figure 21 shows that in the week from May 27 to June 1, about half of the purchases were new and half were old potatoes.

It also shows that the families with lower incomes were buying the larger proportion of the old Maine potatoes. In the following week,

²⁵ Prices for less than pecks were converted to prices per peck for comparison.

there was little change in the proportions of old and new potatoes purchased and approximately the same relationship between family incomes and purchases prevailed. In the week from June 10 to June 15, the percentage of old Maine potatoes purchased by Boston consumers was very much smaller, and the proportion of low-income families purchasing them was somewhat larger. In the week following, the proportion of old Maine potatoes available in the market had been reduced to a still lower figure, and these were being purchased mostly by the lowest-income groups.

A similar relationship in figure 24 shows that during the first 2 weeks of June about half of the consumers reported purchases of new potatoes. Prices, however, were declining, and the percentage purchasing new potatoes increased rapidly.

Source of potato purchases in bulk packages as related to family income (table 65) shows that in June the percentage of families purchasing from chain stores grew larger as the family income increased. These data also indicate that the percentage of low-income families purchasing from hucksters was greater than the percentage of higher-income families using that source of supply.

TABLE 65.—Purchases of old and new potatoes in bulk packages, by income groups and source of purchase, Boston, Mass., Feb. 26 to Apr. 6 and May 27 to June 29, 1940

Crop and family income per week	Families reporting	Source of purchase				Total
		Large chain groups	Other chain groups	Independent stores	Hucksters	
Old potatoes (Feb. 26-Apr. 6):	<i>Number</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
\$15 or less.....	120	30.8	11.7	34.2	23.3	100.0
\$16-\$25.....	307	39.7	11.4	36.8	12.1	100.0
\$26-\$35.....	336	42.9	10.7	36.3	10.1	100.0
\$36-\$45.....	200	28.0	13.5	43.0	15.5	100.0
\$46-\$55.....	125	33.6	9.6	41.6	15.2	100.0
\$56 or more.....	65	36.9	9.2	38.5	15.4	100.0
Total.....	1,153	36.8	11.3	38.1	13.8	100.0
Old potatoes (May 27-June 29):						
\$15 or less.....	67	28.4	1.5	37.3	32.8	100.0
\$16-\$25.....	109	29.4	5.5	35.8	29.3	100.0
\$26-\$35.....	139	30.9	7.2	36.0	25.9	100.0
\$36-\$45.....	90	34.3	8.1	37.4	20.2	100.0
\$46-\$55.....	33	33.3	8.1	36.4	18.2	100.0
\$56 or more.....	20	55.0	10.0	25.0	10.0	100.0
Total.....	467	32.1	6.6	36.0	25.3	100.0
New potatoes (May 27-June 29):						
\$15 or less.....	21	9.5	19.0	52.4	19.1	100.0
\$16-\$25.....	112	22.3	8.0	43.8	25.9	100.0
\$26-\$35.....	177	35.6	11.3	33.3	19.8	100.0
\$36-\$45.....	164	43.3	6.7	36.0	14.0	100.0
\$46-\$55.....	80	37.5	18.8	33.7	10.0	100.0
\$56 or more.....	65	49.2	10.8	32.3	7.7	100.0
Total.....	619	36.0	10.7	36.5	16.8	100.0

Family Income and Prices

It would be desirable if preferences of all families with respect to size, quality, and cooking characteristics of potatoes could always be completely satisfied. Such factors as differences in soil and in production methods as well as differences in variety and in temperature and rainfall result in the production of crops which include a variety of quality characteristics. The most desirable potatoes, therefore, are not available in sufficient quantity to supply all the consuming population. Under these circumstances, the families in the higher-income group and with the greater purchasing power are more likely to be able to purchase at higher prices and, therefore, get the more desirable product. Families in the lower-income group are more likely to subordinate preference to the necessity of buying food at a lower price.

Data already presented show that prices for packages smaller than a peck tended to be at higher rates than prices of either branded or unbranded pecks. Table 66 summarizes average prices paid by consumers in the various income groups for packages of different sizes. These data show, in addition to the difference in price associated with different size and kind of package, the fact that the higher-income

TABLE 66.—Average prices per peck of old and new potatoes, by specified packages and by income groups, Boston, Mass., Feb. 26 to Apr. 6 and May 27 to June 29, 1940

Crop and family income per week	Families reporting ¹	Weighted average price per peck		
		Less than pecks	Branded pecks	Unbranded pecks
	Number	Cents	Cents	Cents
Old potatoes (Feb. 26-Apr. 6):				
\$15 or less.....	134	41.8	39.6	36.1
\$16-\$25.....	367	41.1	41.0	37.3
\$26-\$35.....	449	42.1	40.5	38.7
\$36-\$45.....	256	44.8	40.1	38.9
\$46-\$55.....	163	43.4	40.3	40.7
\$56 or more.....	91	44.6	39.9	42.0
Total.....	1,460	42.6	40.4	38.4
Old potatoes (May 27-June 29):				
\$15 or less.....	65	45.3		42.1
\$16-\$25.....	121	53.7	46.4	40.0
\$26-\$35.....	170	49.5	45.2	41.8
\$36-\$45.....	125	49.5	45.3	43.8
\$46-\$55.....	47	48.1	44.4	44.6
\$56 or more.....	27	61.7	48.3	45.0
Total.....	555	50.3	45.5	42.5
New potatoes (May 27-June 29):				
\$15 or less.....	20	57.1		37.2
\$16-\$25.....	112	57.3		41.0
\$26-\$35.....	175	56.5		45.5
\$36-\$45.....	164	61.7		45.1
\$46-\$55.....	79	61.3		46.7
\$56 or more.....	64	61.6		45.4
Total.....	614	59.2		44.7

¹ Purchases of the few packages of more than pecks and of branded pecks of new potatoes omitted from this table.

families paid the higher prices for potatoes with the exception of branded pecks.

Purchases of Prince Edward Island Potatoes

In March, an occasional report showed the purchase of potatoes from Prince Edward Island, Idaho, or some origin other than Maine. In June, 467 families gave price information on purchase of potatoes from Maine and 89 on potatoes from Prince Edward Island. Distribution of the latter purchases, by kind of package and by retailer, and the range of prices paid is shown in table 67. Potatoes from Prince Edward Island usually were carefully graded and sized and were likely to be prized by Boston consumers. Almost half of the purchases reported were made at independent stores, although some chain stores and hucksters also sold them. The lowest price reported was 35 cents for an unbranded peck. The upper limit of the reported range for this package was 74 cents. The range in price for small packages was from 38 to 94 cents per peck. Only three purchases of branded pecks were reported. Classified according to the family income of the purchaser, in table 68, the data show that purchasers of Prince Edward Island potatoes were much more likely to have high than low family incomes.

TABLE 67.—*Purchases of Prince Edward Island potatoes, by source of purchase and kind of package, Boston, Mass., May 27 to June 22*

Kind of package	Purchases from—				Total purchases	Price range per peck
	Large chains	Other chains	Independent stores	Hucksters		
	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Cents</i>
Less than pecks	11	9	25	7	52	38-94
Branded pecks	2		1		3	38-41
Unbranded pecks	13	3	16	2	34	35-74
More than pecks						
Total	26	12	42	9	89	35-94

TABLE 68.—*Purchases of Maine and Prince Edward Island potatoes, by income groups, June 1940*

Family income per week	Potatoes originating in—		Total	Percentage. Prince Edward Island
	Maine	Prince Edward Island		
	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Percent</i>
\$15 or less	67	3	70	4.3
\$16-\$25	109	12	121	9.9
\$26-\$35	139	18	157	11.5
\$36-\$45	99	29	128	22.7
\$46-\$55	33	17	50	34.0
\$56 or more	20	10	30	33.3
Total or average	467	89	556	16.0

Consumers' Buying Practices and a Marketing Program

Although the data presented with reference to purchases in March and in June, and the variations in price levels and in kinds of potatoes offered for sale provide a rather mixed lot of information from which to draw conclusions, two or three facts stand out clearly. The first is that consumers at all periods and for all packages were paying a wide range of prices. Some consumers purchased at low prices to conserve the family income, and others paid high prices presumably for certain quality, size, or cooking characteristics. The data also showed that, whereas high prices were paid occasionally by families reporting low incomes, and low prices were paid sometimes by families reporting high incomes, there was a definite tendency for the higher prices to be paid by the families with the higher incomes. The data also showed that consumers shifted from one size of package to another under conditions of changing quality and falling price. These data indicate that there is a market in Boston for some carefully selected, graded, and packaged potatoes at prices higher than those paid by the majority of consumers. They also indicate that a marketing program based on only one type of package would be unsatisfactory at some seasons and under some conditions of the market.

RETAIL DISTRIBUTION OF POTATOES

IN STUDYING a particular market for a particular product, an understanding of retail operations frequently is important. It is in the retail store that a study of quality which consumers purchase can be most effectively made and associated with price. It is important also to know whether the retailers have correctly evaluated the preferences of the consumers they serve, or whether a retailer educational program is necessary to acquaint them with these preferences. In short, having determined from consumers the characteristics and qualities of the product which make it most useful to them, a study in retail stores is very useful in determining how well the consumers are being served in these respects and may point out some of the steps for improving that service.

With these objectives in mind, a limited number of retail stores were selected in Boston. Data were gathered from the stores in March, and from most of them again in June. Data gathered in March will be presented with such modifications or additions as appear necessary from the point of view of the data gathered later.

Method and Scope of Study

Each of the families interviewed as reported above was asked to give the name and address of the retail store at which the last purchase

of potatoes was made. From this list of stores selections for study were made. It frequently happened that several of the consumers interviewed purchased from the same store, and a considerable number of small independent retailers were not patronized by any of the consumers covered by the survey. It was thought desirable to have information from a group of small stores not named by the consumers. Enumerators, therefore, were assigned to certain shopping districts in which they were directed to get records from all the smaller independent stores that handled potatoes. A sample of 48 records was gathered in this way.²⁶ Distribution of the sample of retail stores among independent stores named by consumers, large chain stores, units of small local chains, and independent stores not designated by consumers is shown in table 69. Fifty-five percent of all the stores selected by this procedure were within the City of Boston proper, and the rest were in the suburban area surrounding Boston. About 54 percent of the stores were members of chain systems; the remainder were independent.

TABLE 69.—*Location and ownership of 368 retail stores included in the sample, Boston metropolitan area, March 1940*

Location	Stores in group I ¹			Stores in group II ²	Total
	Independents	Large chains ³	Local chains	Independents	
City of Boston	76	80	20	33	203
Suburban area ⁴	53	74	23	15	165
Total area	123	154	43	48	368

¹ Taken from list mentioned by consumers.

² Taken as less important independent stores in assigned "shopping centers."

³ Includes certain stores of the 3 large chain organizations.

⁴ The suburban area included: Arlington, Belmont, Brookline, Cambridge, Chelsea, Everett, Malden, Medford, Melrose, Revere, Watertown, Winthrop, and Somerville.

Because of the method of selection used, one characteristic was common to all stores—the fact that potatoes were sold. The sample was not intended to be proportionately representative of any class of food stores. The selections did provide, however, illustrations of certain characteristics and practices of the more important stores selling potatoes.

Importance of Study to Retailers

It has already been pointed out that consumers purchase potatoes rather frequently. The data for March indicated that about two-thirds of the families surveyed could be expected to make at least one

²⁶ For a detailed analysis of March data for retail stores see H. W. Mumford, Jr., *Marketing Maine Potatoes—Retail Distributors in the Boston Metropolitan area, March, 1940*—F. C. A. Misc. Report 26, 32 pp. 1941.

potato purchase in any given week. The data also showed that approximately 97 percent of the consumers purchased and used potatoes. These two facts are important to retailers because they indicate, (1) that almost all their customers are using potatoes, and (2) that these families were represented frequently in some store purchasing potatoes. It is important to retailers, therefore, that they provide these customers with a package of potatoes prepared as nearly as possible to meet the requirements of the family. By doing this, the retailer encourages patronage and creates goodwill for his business.

The Producer's Interest in Retail Practices

The producer's interest in the operations and practices of the retail store lies in the fact that the consumer served by the retailer is the final customer for the producer's product. The retailer, therefore, is in some respects the producer's agent or representative in distribution. If producers interest themselves in growing and marketing products of quality and character meeting the consumers' requirements, it is important that the retailer as well as the other marketing intermediaries conduct their businesses in such a way as to preserve these quality characteristics.

When the retailer transfers the product to the consumer at a reasonable price and with the desirable characteristics intact, the chain of services from the producer to the consumer has been completed, and all the market intermediaries may be assumed to have discharged their functions satisfactorily. If, on the other hand, the consumers' preferences have been misinterpreted or if, in an attempt to gain additional profit, practices have been used which are not consistent with satisfactory services, much of the work done by a group of producers becomes fruitless, with resulting loss of goodwill toward the product. It is important to the producers, therefore, that those who represent them in marketing their product conduct their various businesses in such a way as to gain consumer approval.

Retail Practices in the Marketing of Potatoes

Most of the Maine potatoes purchased by retailers were in 100-pound burlap bags. For potatoes from other producing areas, however, the type of container varied. Sometimes potatoes from the South were bought in barrels or baskets, and potatoes from some areas were purchased in burlap bags of varying sizes. When retailers purchased these large containers, the potatoes had to be repackaged at the retail store in the quantities usually purchased by consumers. Large numbers of half-peck or peck packages were put up in advance of sale in ordinary paper bags.



FIGURE 25.—Potatoes damaged by rough handling. When potatoes are hard and brittle, they must be handled carefully. Dropping or bruising packages may cause some of the potatoes inside to be shattered.

Another practice was to allow the purchaser to select the potatoes. Many customers preferred to do this. The potatoes were displayed in bulk lots of 100 pounds or in bushel baskets, or some other quantity in the store, and the customer selected those which were most desirable. In the process of selection, either by the retailer or by the consumer, there was some loss. Potatoes which were damaged by rough treatment or which had developed rot or other excessive damage were discarded. (Fig. 25.) Occasionally, when the proportion of potatoes to be discarded was too great or when there was too large a proportion of small potatoes the package was returned to the jobber for a refund or for credit on the next purchase.

Ordinarily, however, the retailer attempted to sell all the potatoes purchased by including in each package a few of the potatoes which would ordinarily be considered too small, too large, or slightly damaged. In following this practice, the retailer probably had very little choice. He purchased bulk lots and if he followed the practice of returning potatoes for credit too frequently, he soon would find that it was impossible for him to purchase his requirements except at higher prices. If, on the other hand, the retailer was highly selective in picking out potatoes for his consumer patrons, he would find so many potatoes in the package unsold that he had to charge higher prices. Selectivity, therefore, on the part of a retailer was likely to place him at a disadvantage in price competition, and could be practiced only by those retailers who had a clientele willing to pay higher prices for such selection.

Retailers in Boston frequently purchased potatoes in 15-pound consumer packages put up either by the producer at the shipping point or by the jobber in the wholesale market. These potatoes were packaged in heavy paper bags, fastened with wire, and the retailer rarely had an opportunity to see them but depended on the care with which the packer graded and standardized them to satisfy his consumer patrons.

If adequate care were used to insure the consumer's satisfaction and if, at the same time, the packages were handled with sufficient care to prevent additional damage in the process of shipment to market, such packages would be satisfactory. Their use in Boston during the marketing season 1939-40 was mostly by the large chain stores, although a considerable number of independent retailers used them to a limited extent. These packages cost slightly more and usually were sold at higher retail prices than potatoes sold in bulk. They had the advantage that, if properly packed, there was no loss to the retailer in selling them, but unless the packer used considerable care in preparing the package for the consumers' use, dissatisfaction resulted later.

Retailers' Appreciation of Consumer Preferences for Size

Retailers were asked to give their opinions as to the sizes of potatoes their customers preferred, both for general purposes and for baking potatoes. About 38 percent of the retailers who expressed opinions on customer preferences indicated a 2½ inch diameter as the minimum size acceptable, and over 40 percent indicated 2¾ inches as an acceptable maximum size. The data also indicated that there was not a great deal of difference between potatoes acceptable for baking and those for all-purpose uses. In general, particularly with respect to the minimum size, there was a tendency for size preference for baking potatoes to run about one-fourth inch larger than for all-purpose potatoes. These relationships may mean that Boston customers have found Maine potatoes in medium sizes acceptable for most purposes.

From these replies it is apparent that the retailers were aware of the preferences for medium-sized potatoes which were reported by consumers.

Size and Defects in Potatoes Accepted for Sale by Boston Retailers

A study of the effectiveness of marketing practices in providing consumers with potatoes sized and graded to meet the satisfaction in use was one of the objectives of this Federal-State fruit and

vegetable inspectors gathered information with reference to the grade characteristics of the potatoes and the price at which they were sold.

A summarization of the inspection of potatoes in retail stores appears in table 70. In this study, 230 packages marked U. S. No. 1 and packed in 100-pound bags were inspected; and 445 packages marked U. S. No. 1, packed in 15-pound branded consumer packages. In addition, 129 store packages were inspected, which were unmarked as to grade and which it was impossible to identify as having come from packages specifically carrying a grade indication. Table 70 shows the percentage of packages in each of these groups graded U. S. No. 1. It also shows the percentage of U. S. No. 1 quality found in those packages which did not grade U. S. No. 1. In addition, it shows that 31 percent of the 100-pound packages and 5 percent of the 15-pound branded consumer packages were underweight prior to the time they were sold to consumers in retail stores. The 100-pound packages, of course, were later reduced to some sort of store packages, and may not have been underweight when sold to the consumer. The fact that they were underweight when purchased increased the cost per pound of potatoes to the retailer.

The data in table 70 for potatoes all having the same grade terminology point clearly to the fact that potatoes are not very well standardized for the consumer's use. If, for instance, a consumer purchased a package of potatoes which were actually U. S. No. 1 from the point of view of absence of defects, the chance that her next purchase would contain as few as 6 percent of defects was only slightly better than 3 out of 5. In other words, if a consumer purchased 5 packages of potatoes under the conditions shown by these inspections, the consumer would expect that 3 of these packages would have fewer than 6 percent of defects, and 2 would have more; and, of the two which had more, at least one would have considerably more.

Inspections of potatoes in retail stores in June (table 71) necessarily

TABLE 70.—*Summary of inspection of potatoes in 368 retail stores in Boston, March 1940—Percentage of packages grading U. S. No. 1 or containing various percentages of U. S. No. 1 quality*

Packages	Per-centage grading U. S. No. 1	Percentage of U. S. No. 1 quality				U. S. No. 1 except for soft rot	Total	Under weight	Total pack-ages
		89-94	83-88	77-82	76 or less				
100-pound burlap bags marked U. S. No. 1	59	22	13	4	2	0	100	31	230
15-pound branded packages marked U. S. No. 1	61	28	8	2	1	(?)	100	5	445
Store packages without grade identification	35	39	12	9	4	1	100	(?)	129

¹ Less than ½ percent.

² Not available.

TABLE 71.—Summary of inspections of potatoes in retail stores in Boston, June 1940—Percentage of packages grading U. S. No. 1 and percentage of U. S. No. 1 quality in packages not grading U. S. No. 1¹

Package identification	Percentage grading U. S. No. 1	Percentage of U. S. No. 1 quality in bags not grading U. S. No. 1				U. S. No. 1 except for soft rot	Total	Under weight	Total packages
		89-94	83-88	77-82	76 or less				
15-pound branded packages from Maine marked U. S. No. 1	65	4	12	8	11	0	100	4	26
100-pound burlap bags from Maine marked U. S. No. 1	69	17	11	0	3	0	100	25	35
100-pound and 75-pound bags from Canada marked U. S. No. 1	87	9	0	2	0	2	100	29	45
100-pound bags from Maine and Canada without grade marks	50	7	0	14	22	7	100	14	14
100-pound cobbles from North Carolina marked U. S. No. 1	83	7	2	0	2	6	100	11	54
60-pound baskets of Katahdins from Florida marked U. S. No. 1	70	10	10	5	0	5	100	5	19

¹ In addition to the packages and classifications listed several other miscellaneous packages from southern shipping points were found in Boston in quantities too small for summarization.

covered a much more varied group of packages because, during that month, potatoes were coming from more sources of supply. The source for Boston shifted from Maine, as the principal point of origin, to potato-producing sections in the South. In June 1940 also, potatoes from Prince Edward Island were found in Boston in larger proportions than in March. Results of inspections for June were very similar to those for March. Packages marked U. S. No. 1, when shipped from Maine, included between 60 and 70 percent of packages which actually graded U. S. No. 1. The remainder were of lower grade, although usually containing more than 80 percent of U. S. No. 1 quality. A larger percentage of the packages in shipments from Canada, when marked U. S. No. 1, apparently graded as such. Approximately half of the packages from either Maine or Canada which were not marked U. S. No. 1 actually were of U. S. No. 1 quality. Apparently, a larger percentage of the potatoes shipped from the South actually graded U. S. No. 1 than of those shipped from Maine.

The large number of classifications and the small number of packages in each group classified made the June data less dependable than the data presented for March. The same tendency toward lack of standardization, however, was present, and prompted further inquiry into the reasons for defects.²⁷ The conclusion from the data for June, as for March, was that the wide variation in the percentage of defects to be found in individual packages of potatoes would make it impossible for consumers to purchase them consistently with any

²⁷ Research reported as indicated on page 146, item 7.

degree of assurance that one package would be essentially the same as the package previously purchased.

Further Analysis of Defects

The defects in the U. S. No. 1 potatoes inspected in Boston retail stores were of many kinds. Some information as to their source and the possibility of placing them under control may come from a more detailed study of each defect to show which caused the most damage. Table 72 shows the kind of damage most in evidence in 445 branded consumer packages inspected in March 1940.

TABLE 72.—Defects found in 445 15-pound branded consumer packages in 368 retail stores in Boston, and the relative importance of each as a source of damage to potatoes, Boston, March 1940¹

Defect	Percentage of packages showing indicated damage							Total
	No damage	Less than 1.5 percent	1.5 to 2.4 percent	2.5 to 3.4 percent	3.5 to 5.4 percent	5.5 to 10.4 percent	10.5 to 20.5 percent	
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Old bruises.....	28	1	24	32	5	9	1	100
Mechanical injury.....	44	(²)	23	20	4	8	1	100
Disease.....	83	(²)	10	5	1	1	0	100
Dry rot.....	88	(²)	10	2	0	0	0	100
New bruises.....	90	0	4	5	(²)	1	0	100
Wet rot or soft break-down.....	98	0	1	1	0	(²)	0	100
All others.....	90	0	5	3	1	1	(²)	100

¹ Maine potatoes marked U. S. No. 1.

² Less than 1 percent.

Bruises and mechanical injury were the defects responsible for most of the damage found in these inspections. This type of damage comes from handling both in digging and in marketing. From these data it is impossible to determine whether the damage shown was present

TABLE 73.—Defects found in 320 100-pound bags of Maine potatoes in 368 retail stores in Boston, and the relative importance of each as a source of damage to potatoes, Boston, March 1940¹

Defect	Percentage of packages showing indicated damage								Total
	No damage	Less than 1.5 percent	1.5 to 2.4 percent	2.5 to 3.4 percent	3.5 to 5.4 percent	5.5 to 10.4 percent	10.5 to 20.4 percent	20.5 or more percent	
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Old bruises.....	7	20	34	12	14	11	2	(²)	100
Mechanical injury.....	16	28	30	11	10	4	1	0	100
Disease.....	45	34	12	4	4	1	(²)	(²)	100
Dry rot.....	61	33	3	3	0	0	0	0	100
New bruises.....	67	21	5	1	3	1	2	0	100
Wet rot or soft break-down.....	86	14	(²)	0	0	0	0	0	100
All other.....	79	10	7	2	2	0	(²)	(²)	100

¹ Maine potatoes marked U. S. No. 1.

² Less than 1 percent.

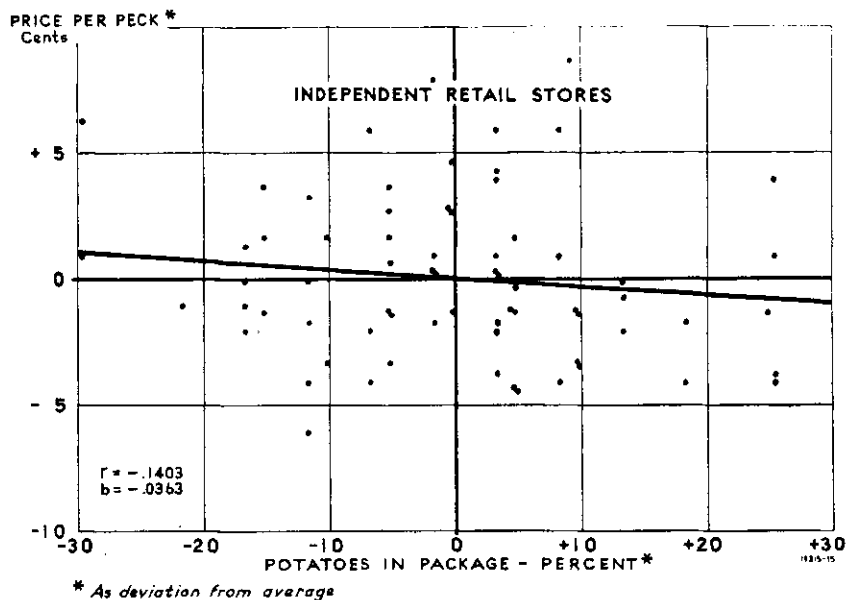
at the time of shipment or accumulated while the potatoes were en route to the retail store.²⁷

Data showing the same analysis of defects from inspections of 320 100-pound bags of Maine potatoes as shown in table 73 yield approximately the same results.

Relationship Between Retail Price and Quality in Independent Stores

Data have been presented, showing that consumers consider medium size, as represented by diameters of from $2\frac{1}{4}$ to 3 inches, a desirable characteristic in potatoes. Inspections in retail stores took account of the percentage of potatoes in each package found to be under $2\frac{1}{4}$ inches in diameter and, therefore, too small to be acceptable to most consumers. The percentage of potatoes under $2\frac{1}{4}$ inches in each package and the retail price, as reported by independent stores, were correlated²⁸ to determine whether there was a relationship be-

FIGURE 26.—RETAIL PRICES FOR POTATOES AS RELATED TO THE PERCENTAGE UNDER $2\frac{1}{4}$ INCHES IN DIAMETER IN THE RETAIL PACKAGE, BOSTON, MARCH 4, TO APRIL 6, 1940.



* As deviation from average

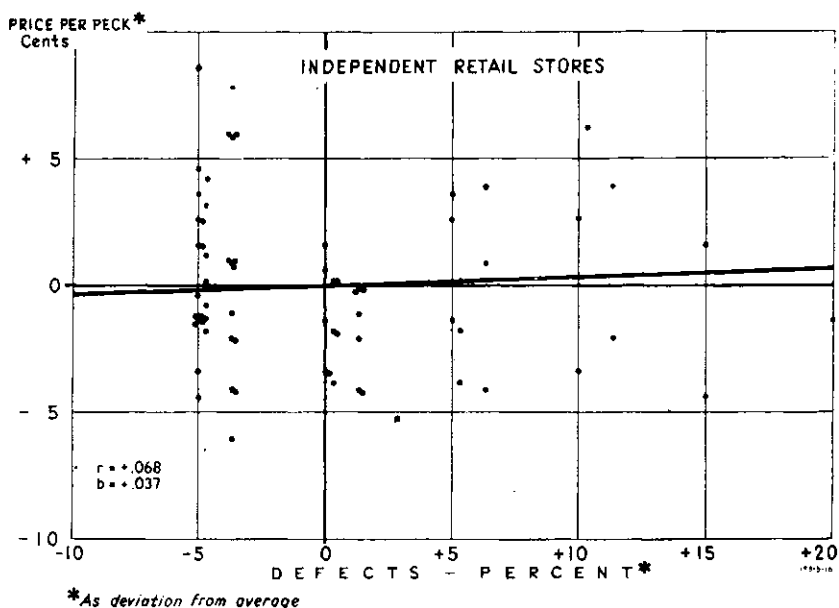
Correlations of Equal Magnitude Might Occur Frequently in Entirely Unrelated Data.

²⁷ Research reported as indicated on page 146, item 7.

²⁸ Correlation is a statistical procedure for measuring relationship.

tween the retail price and the percentage of small potatoes. The correlation chart (figure 26) shows a wide range of percentages and prices.²⁹ The correlations were found to be insignificant because correlations of equal magnitude might occur frequently in entirely unrelated data. This leads to the conclusion that potatoes were not priced in accordance with the preferences of consumers even though retailers were cognizant of this preference. The retail price, in other words, was not a reliable guide in purchasing. The only way consumers could consistently get the sizes they desired was to select them personally from the bulk packages in the retail stores.

FIGURE 27.—RETAIL PRICES OF POTATOES AS RELATED TO THE PERCENTAGE OF DEFECTS IN THE PACKAGE, INDEPENDENT RETAIL STORES, BOSTON, MARCH 4 TO APRIL 6, 1940.



No Significant Relationship Is Indicated Between the Percentage of Damaged Potatoes in the Package and the Retail Price.

The percentage of damage in the retail packages of potatoes offered for sale in Boston was discussed above. The question was raised as to whether retail prices were made in such a way as to reflect varying percentages of damage in the packages. The correlation diagram, figure 27, shows that no significant relationship was found to exist between the percentage of damaged potatoes in the package and the retail price. The conclusion again is that only those consumers who made personal selection of their potatoes from bulk packages in retail

²⁹ Prices advanced during the time these data were being gathered. To take account of the effect of rising prices, the correlations were made in terms of deviations from average for each week.

stores were able to protect themselves against the purchase of an occasional package containing excessive damage.

Perhaps the most important thing about these two correlation charts is that they suggest that consumers were not given an opportunity to make a selection of potatoes priced in accordance with varying standards of size and defects. The data indicate that size and damage were distributed throughout the packages marked U. S. No. 1, both in branded packages and in 100-pound packages, in such a way as to prevent price being a reasonable guide to quality. Under these conditions, the experienced and frugal consumer would discover that a high price was not an indication of more desirable potatoes and that, for careful buying, selection on the basis of low price would be most practical. Potatoes marked U. S. No. 1 and bought at lower-than-average price were just as likely to contain average quality as potatoes of the same grade, marked at higher prices.

Relationship Between Retail Price and Quality in Selected Chain-Store Units

In the chain stores there was little variation in retail prices of potatoes from day to day, and in all the three large chain systems the prices tended to be alike. If, for instance, in one store of one chain the price of branded peck packages was 41 cents, the price was likely to be the same in all stores of that chain as well as in stores of the other two large chains.

Under these conditions, to show a relationship between price and quality, the range in quality variation among packages would need to be small since there was no variation in price. A wide range in qualities selling at the same price would not indicate a close relationship between price and quality.

The procedure followed was to select packages sold at the same price and see how the quality factors corresponded with the price. In making this comparison, data for each chain were kept separate.

Branded packages marked "U. S. No. 1" and selling at 43 cents per peck during the last week in March and the first week in April were selected for comparison. Table 74 shows this comparison of the three chain-store organizations based on the percentage of damage in the potatoes.

These data show a wide range in percentage of damage, over 15 percent of all the packages having 10 percent or more, and 55 percent having 5 percent or less. Only 7 packages inspected showed no damage at all. The wide variation in the percentage of damage in packages with the same trade-mark and sold at the same price shows that a consumer purchasing such a package and finding 5 percent or less of damage had little better than an even chance that the next package

TABLE 74.—Percentage of damage in branded peck packages of potatoes inspected in retail units of each of 3 large chain-store organizations, Boston, Mass., Mar. 23 to Apr. 6, 1940

[Retail price—43 cents per peck]

Chain-store group	Packages with various percentages of damage			
	Less than 5.6 percent	5.6 to 10 percent	More than 10 percent	Total
	Number	Number	Number	Number
A.....	25	26	4	55
B.....	7	5	6	18
C.....	49	12	13	74
Total.....	81	43	23	147

would be equally satisfactory. The chances were that one package out of the next 6 or 7 would have 10 percent damage or more.

Following this analysis further, the question of consistency with respect to percentage of damage between groups of chain-store units was raised. An expected frequency for the number of packages in each percentage-of-damage group for each chain was calculated, using data from all 3 of them as a basis for estimating. The differences from this expectation are shown in table 75. These data show that chain "A" exceeded the expected by 10 packages with 6 to 10 percent damage; chain "B" by 3 packages with more than 10 percent damage; and chain "C" by 8 packages with 5 percent of damage or less and 2 packages with 10 percent of damage or more. These data also indicate that these differences are too great to be considered accidents of sampling and were probably caused by differences in procurement and handling practices.

TABLE 75.—Excess of deficiency from expectation in percentage-of-damage groups inspected in retail units of each of 3 large chain-store organizations in Boston, Mass., Mar. 23 to Apr. 6, 1940

Chain store	Packages in each percentage-of-damage group			
	Less than 5.6 percent	5.6 to 10 percent	More than 10 percent	Total
	Number	Number	Number	Number
A.....	-5	+10	-3	0
B.....	-3	0	+3	0
C.....	+8	-10	+2	0
Total.....	0	0	0	0

Relationship Between Price and Size in Selected Chain-Store Units

Both retailer and consumer data have indicated that size was an important factor in consumer preference and that potatoes less than $2\frac{1}{4}$ inches in diameter were considered small by most consumers. The

following analysis of size is based on the same 147 branded packages studied with respect to damage in tables 74 and 75. These packages were found in the retail units of the three large chains and offered for sale at 43 cents per peck. The present comparison is made on the basis of the percentage of potatoes under $2\frac{1}{4}$ inches in diameter. Table 76 shows the data classified in percentage groups. It shows that a consumer who purchased a package in which 20 percent or less of the potatoes were under $2\frac{1}{4}$ inches in diameter had, on the average, less than an even chance of repeating at the next purchase.

TABLE 76.—Percentage under $2\frac{1}{4}$ inches diameter in branded peck packages of potatoes inspected in retail units of each of 3 large chain-store organizations in Boston, Mass., Mar. 23 to Apr. 6, 1940

[Retail price—43 cents per peck]

Chain-store group	Packages with various percentages under $2\frac{1}{4}$ inches in diameter				Total Number
	20 or less	21-30	31-40	41 or more	
A.....	Number 13	Number 22	Number 14	Number 6	55
B.....	5	4	5	4	18
C.....	43	13	14	4	74
Total.....	61	39	33	14	147

Continuing this comparison to show how each group of chain-store units compared with the average for all of them, table 77 shows that chain "A" exceeded expectations with 7 packages in the 21 to 30 percent group, 2 packages in the 31 to 40 percent group, and 1 package with potatoes $2\frac{1}{4}$ inches or less in diameter making up over 41 percent of the contents. Chain "B" exceeded expectation with 1 package in the 31 to 40 percent group and 2 packages in the 41 percent or more group. Class "C" exceeded expectation with 12 packages in the group having the smallest percentage of potatoes under $2\frac{1}{4}$ inches in diameter.

These data show that there was considerable lack of standardization in the percentage of small potatoes in all three chain-store branded

TABLE 77.—Excess or deficiency in number of packages in each percentage group of potatoes under $2\frac{1}{4}$ inches in diameter inspected in selected retail units of 3 large chain-store organizations in Boston, Mass., Mar. 23 to Apr. 6, 1940

Chain-store group	Packages in each percentage-of-size group				Total Number
	20 percent or less	21-30 percent	31-40 percent	41 percent or more	
A.....	Number -10	Number +7	Number +2	Number +1	0
B.....	-2	-1	+1	+2	0
C.....	+12	-6	-3	-3	0
Total.....	0	0	0	0	0

consumer packages. The standardization was somewhat higher in the case of chain "C." Tests indicate that the differences were greater than could be accounted for on the basis of sampling procedure and since handling does not affect size, the differences were probably due to procurement and packing practices.

Comparison of Gradings of 100-Pound Burlap Bags Inspected at Selected Retail Units of Three Large Chain Stores in Boston, March 23 to April 6, 1940

Data were gathered on size and percentage of damage in 100-pound burlap bags inspected in retail stores and could be presented in the same detail, but they do not have the same significance. Potatoes in burlap bags are converted into store packages or sold by consumer selection and, therefore, do not indicate the contents of the consumer's package. It may be assumed that the retailer in each instance tries to sell all the potatoes delivered at the store, but this can not be done because some loss is borne by most retailers in stock discarded as unsalable.

The variation in percentage of damage in 100-pound bags was as wide as in branded packages. The variation in sizes was equally wide. The potatoes were reported as offered for sale at 37 cents per peck. The difference between 100-pound packages of potatoes found in the various chain units, as compared with each other, was not sufficiently great to indicate differences in procurement or handling practices.

These data are not offered as indicating anything more than the fact that practices in marketing potatoes were not standardized to the point where consumers could buy with confidence except as they made personal selections. They also show that qualities, to the extent that they are determined by inspection, were not closely related to retail prices.

Retailers' Gross Margin³⁰

The retailer's gross margin is the difference between what he pays for potatoes and the price at which he sells them. These margins vary considerably among retail stores. Figure 28 shows this variation in gross retail margins for potatoes sold from bulk and in branded packages by independent retail stores.

Gross margins in chain stores were also gathered in the process of this survey, but are not presented here because they are not comparable, by reason of the fact that for chain stores gross margins are the difference between the cost at which the potatoes are delivered to the chain-store unit and the selling price, both of which are usually

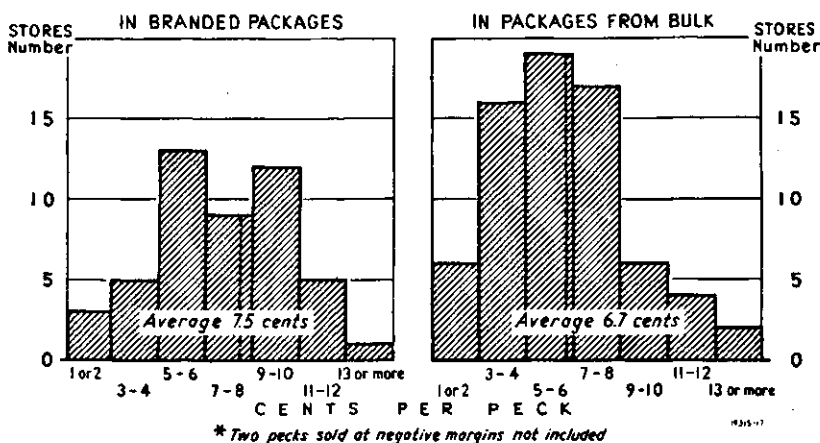
³⁰ Further analysis of data on retail margins will be prepared for later publication.

determined by the overhead organization. Gross margins in chain stores, therefore, are very likely to be determined by costs and selling prices, over which the retailer has little control. In independent stores, on the other hand, each retail unit is less restricted in the determination of prices.

The data shown in figure 28 would indicate that margins for branded packages were larger than those for packages sold from bulk. For the period during which these data were gathered, this probably was true because, it will be recalled, that prices for branded packages were advancing throughout the period, whereas prices for pecks sold from bulk apparently advanced very little. At the same time, there was some tendency for the wholesale price to advance, which indicates that probably cost of the potatoes to the retailer also advanced. The data, therefore, may reflect the tendency on the part of retailers to avoid advancing retail prices for bulk packages, while those for branded packages were advancing. The difference, therefore, may be largely associated with the time when the margins were gathered, and may not reflect differences in margin which are likely to be found in the market throughout the season.

Although branded packages cost the retailer more than unbranded packages, there were some advantages in selling them which should operate to keep gross margins down. In the first place, the loss is likely to be smaller, since the branded packages usually are not opened in the retail store and the contents are sold as purchased without the removal of excessively damaged or very small potatoes. In putting

FIGURE 28.—GROSS MARGINS PER PECK REPORTED BY INDEPENDENT RETAILERS SELLING POTATOES IN BOSTON, MARCH 14 TO APRIL 9, 1940.



During the Period Indicated, Average Margins for Branded Packages Were Larger Than Those for Packages Sold In Bulk.

up packages for sale to consumers in bulk, on the other hand, there were likely to be some losses through shrinkage which increased the retailer's cost.

It is sometimes argued that branded packages should be sold at small margins in retail distribution because of the difference in clerk time required for handling them. The retailer, for instance, does not have to provide extra help for packaging, either before sale or at the time of the customers' purchases. The reasoning here is not entirely clear because it depends on the efficiency with which help needed in the store may be used in slack periods. If, for example, the retailer has help in the store that is not fully employed throughout the days when retail trade is light, it might be more efficient for the retailer to package potatoes from bulk than to purchase them already packaged. The answers to these questions, of course, lie in the organization of each retail store.

The diagrams in figure 28 seem to indicate that, for independent stores, the usual retail gross margin for this period was somewhere near 7 cents a peck. During the period in which these data were gathered, most of the retail sales for both branded and unbranded packages averaged from 37 to 43 cents a peck. On the basis of an average retail price of about 40 cents a peck, the average retail mark-up would have been in excess of 17 percent.

In terms of bulk packages of 100 pounds, the independent retailer's charge for his services varied widely around an average of about 47 cents per 100 pounds.

Relationship Between Retail Cost and Quality in Retail Stores

The wide variation in independent retailers' gross margins suggests the possibility that, in applying these margins, the relationship between retail price and quality may have been eliminated. This raises the question whether retailers who recognize consumers' preferences actually try to satisfy them in making their purchases of stock. If retailer costs were related to desirable characteristics of size and defects it would indicate that potatoes were purchased by many retailers with their customers' desires in mind.

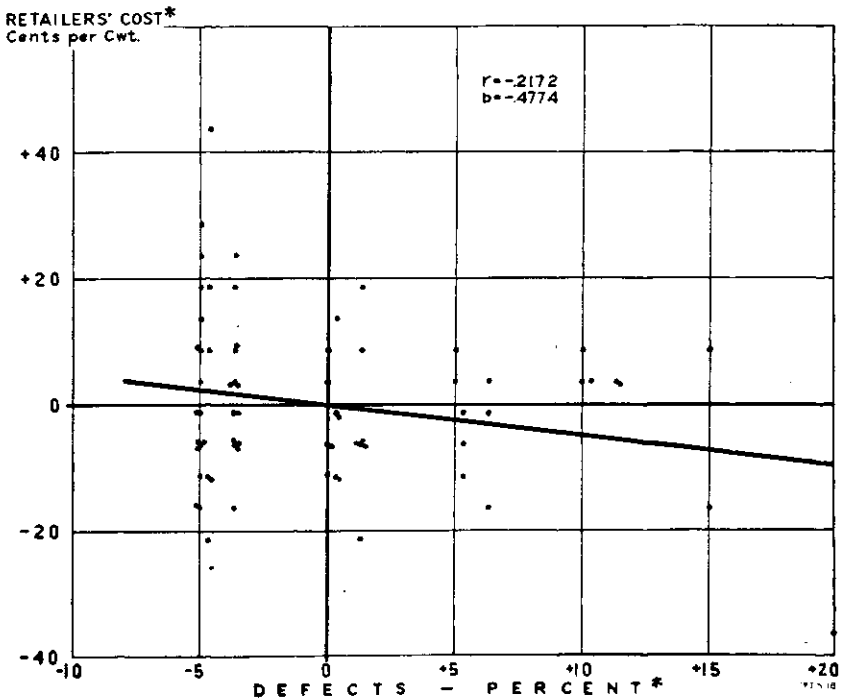
The correlation chart, figure 29, shows the relationship between the retailer's cost and the percentage of defects in packages inspected in retail stores. These data show a wide range both in prices and in percentage of defects. No central tendency is apparent to indicate a real relationship between the two factors. The coefficient of correlation of $-.2172$ is so small that it could have resulted from uncorrelated data one time out of ten. It does not indicate that the percentage of

defects was closely associated with the price paid for stock by the retailer when purchasing U. S. No. 1 potatoes.

The correlation chart (figure 30) shows the relationship between the percentage of small potatoes and the cost to the retailer. There is some slight tendency for the concentration of data to be heavier close to the regression line. The coefficient of correlation $-.3303$ would not be expected to result from uncorrelated data oftener than once in 100 times. The conclusion is that some retailers choose their stock with reference to size and pay higher or lower prices, depending on the presence or absence of desirable size characteristics. The range was very wide, however, and although real relationship exists between the retail cost and the percentage of small potatoes, this relationship was not close enough to make cost a very reliable guide in purchasing.

The further conclusion is that since this relationship was not found in retail prices for the same potatoes, the pricing policies of individual retailers removed most of the small relationship which was present earlier.

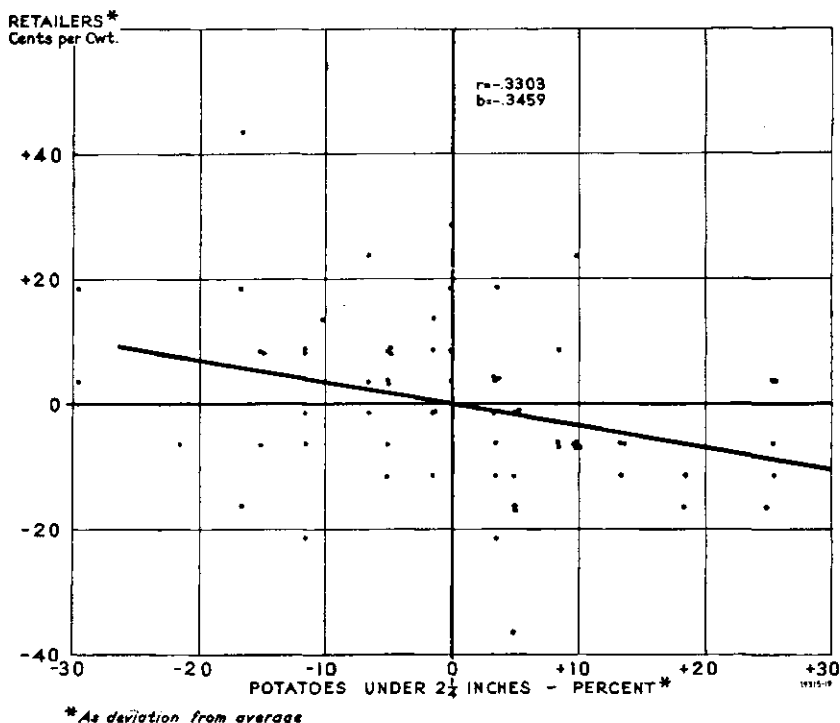
FIGURE 29.—CORRELATION BETWEEN COST OF POTATOES TO INDEPENDENT RETAILERS AND PERCENTAGE OF POTATOES WITH DEFECTS TO GRADE U. S. No. 1.



*As deviation from average

No Central Tendency Was Apparent to Indicate A Real Relationship Between the Two Factors.

FIGURE 30.—CORRELATION BETWEEN COST OF POTATOES TO INDEPENDENT RETAILERS AND THE PERCENTAGE OF POTATOES UNDER 2 INCHES IN DIAMETER.



The Data Show That Some Retailers Chose Their Stock With Reference to Size, and Paid Higher or Lower Prices Accordingly.

Price, therefore, was not a reliable guide to quality and was less reliable at retail than at wholesale.

POTATO GRADES AND STANDARDS

POTATO grades and standards are based largely on quality concepts in which defects in individual potatoes or the percentage of these defects in a lot play an important part. Grades also include such classification concepts as size and variety. The purpose of a grading system is to standardize these quality and classification concepts so that a grade name may be applied to a lot of the product. These grades or trading names are used extensively in the marketing of potatoes, particularly when buyers and sellers are separated by a long distance and trading must be accomplished without personal inspection. The system of grades now in use, together with the regu-

lations and practices under which they are used has been a material aid in marketing to both buyers and sellers.

When a grade name is attached to a lot of potatoes, it describes for the buyer the quality characteristics and the classification of that lot. Variations in prices in any given market on any particular product are likely to reflect differences in grade which are the result of the application of these grading standards. However, one of the most difficult problems in marketing is that of finding and applying standards of quality and classification which adequately describe the product for pricing purposes. The opportunity for misunderstanding between buyers and sellers is greatly increased when wide variations in price occur because of wide variations in market value within a grade.

The U. S. No. 1 grade for potatoes contains a minimum size requirement of $1\frac{1}{8}$ inches in diameter, unless otherwise specified. If more than 5 percent of the potatoes in a lot are below this size requirement or any other specified minimum size, it can not be accepted as U. S. No. 1 grade. In the potato grade, however, only a minimum size requirement is specified, whereas size in general is one of the most important factors contributing to differences in market price. It has been the general policy of the grading authority to leave the matter of size, except that of minimum size, to the contracting agents in any transaction. A contract for U. S. No. 1 potatoes may be fulfilled by delivery of a lot of potatoes none of which are much in excess of $1\frac{1}{8}$ inches, so long as not more than 5 percent are smaller. Potatoes of this size are so small as to be unsatisfactory to most consumers. In recognition of this fact, various size classifications were provided in the U. S. standards to be used in connection with the grade designation. One of these is U. S. No. 1, size A, in which 60 percent of the potatoes of round varieties must be $2\frac{1}{4}$ inches or larger in diameter. In addition to such classifications, other minimum sizes may be specified, such as U. S. No. 1, 2-inch minimum, in which, as indicated, none of the potatoes can be below 2 inches in diameter, with the exception of 5 percent allowed in the tolerance.

These subclassifications have materially improved the description of the sizes of potatoes included in any lot, since they indicate more clearly whether the potatoes are suitable for table use. But even these classifications include a very wide range of sizes, whereas most consumers prefer to buy potatoes classified within a rather narrow range of sizes but sized for baking, since, as a general rule, potatoes which are suitable for baking will be suitable for most other uses. The difficulty in the use of the standards arises in the fact that the grade terminology for U. S. No. 1, size A, or for U. S. No. 1, 2-inch minimum, are equally satisfactory for the grade of U. S. No. 1, whereas potatoes

in which a very large proportion are under 2 inches in size but still above $1\frac{1}{4}$ inches are also adequately described as U. S. No. 1, but much less satisfactory for use by the majority of consumers than the larger sizes.

This grading terminology when used in contractual relations between dealers who thoroughly understand it is satisfactory because an adequate description of sizes required is likely to be included in the trading contract. When this grading terminology is used to describe the quality within consumer packages or even in 100-pound bags sold to the retailers or to consumers who are much less familiar with the problems of grading, deception may arise. Instances have been noted in which potatoes of small size but meeting the minimum size requirements for U. S. No. 1 have been placed in peck packages marked U. S. No. 1. When sold to consumers, considerable criticism with the sizing has resulted.

In addition to the differences in sizes, the U. S. standards provide tolerances for defects. Since these tolerances are described in rather narrow limits, they are not so serious as the problem of size. Nevertheless, the tolerances for defects do constitute a problem in marketing which should not be overlooked. The tolerance for defects permitted in U. S. No. 1 grade is 6 percent. However, damage causing additional defects is almost certain to occur in the process of marketing. In other words, if the shipper in packing his peck packages uses a full 6 percent tolerance at the time of packing, it is probable that when the package arrives in the home of a consumer the percentage of defects will be greater. It is desirable that defects be held at the minimum practical in the consumer package. Consumers, because of habit and custom in the purchase of potatoes, have come to expect some defects in the potatoes they buy. They recognize their presence, nevertheless, as indicated by the consumer data collected.

Students of the subject frequently raise the question as to why there should be a difference between grading for wholesale trading and for consumers. The basis for purchase on the part of the wholesale dealer should be in terms of preferences which are transmitted to them by consumers. Grading is done for consumers and should, insofar as possible, be done as carefully as necessary in the first instance since rehandling is a source of additional cost. The practice of grading for wholesale purposes at the shipping point permits the inclusion of defects and is not accomplished with sufficient precision to make the sizing satisfactory. Retailers, therefore, have to do some sorting for size, or display their stock in bulk lots for the consumers' own selection. Retailers frequently find damaged potatoes in their purchases, which are either discarded or returned to the wholesaler.

Consumer Recognition of Defects

Since grading should be done with the consumers' preferences in view, an attempt was made to find out how closely consumers' reactions to the defects found in potatoes corresponded with the interpretation of these defects by the grading authorities. When potatoes were being reviewed in the households of consumers, therefore, the consumer was asked to separate from the lot at hand those potatoes which, in her estimation, contained defects sufficient to make them undesirable.

When the consumer had made this classification, the inspector characterized the lot on the basis of defects according to the standards for U. S. No. 1 potatoes. The results of these comparisons are shown in table 78. In more than 40 percent of the cases in which branded packages were being inspected, the consumer and the inspector were in agreement as to the number of potatoes which contained identifiable defects. In about 30 percent, the consumer found fewer defects than the inspector. The combination of these two shows that the interpretation of defects in the standards was satisfactory to more than 70 percent of the consumers. In 28.7 percent of the cases, the consumer found more defects than the inspector in branded packages. In the inspection of bulk stock, the inspector and the housewife were in agreement on 43.7 percent of the lots. The inspector was the more critical in 36.9 percent of the lots, and the consumer, or the housewife, was more critical in 19.4 percent. The data indicate that consumers who purchase branded packages may have been more critical than those who purchased from bulk stock. This may also reflect the reason why bulk stock was purchased instead

TABLE 78.—Comparison of defects in potatoes found by housewife and inspector in branded peck and bulk stock purchases, by sampling periods; Boston, March and June 1940¹

Sampling period	Crop	Total families reporting	Branded pecks					Total	Total families reporting	Packages for bulk lots				
			Percentage defects found by housewife, as compared with those found by the inspector			Percent	Percent			Percentage defects found by housewife, as compared with those found by the inspector			Percent	Percent
			More	Less	Same					More	Less	Same		
Mar. 4—Mar. 23	Old	149	39.6	28.2	32.2	100.0	255	34.9	25.1	40.0	100.0			
Mar. 25—Apr. 6	Old	110	23.6	24.6	51.8	100.0	255	17.3	19.2	63.5	100.0			
June 1—June 15	Old	43	11.6	39.5	48.9	100.0	144	16.0	45.8	38.2	100.0			
June 1—June 15	New	—	—	—	—	—	58	6.9	65.5	27.6	100.0			
June 17—June 29	Old	25	16.0	52.0	32.0	100.0	57	8.8	71.9	19.3	100.0			
June 17—June 29	New	—	—	—	—	—	101	4.0	62.4	33.6	100.0			
Total	—	327	28.7	30.3	41.0	100.0	870	19.4	36.9	43.7	100.0			

¹ These data do not include packages in which neither the consumer nor the inspector found any defects.

of branded pecks. Consumers who purchased from bulk by their own selection were more likely to be satisfied.

These data indicated that a large percentage of consumers would have been more satisfied with the potatoes had these defects been removed, since the removal of these defects would have removed most of the damage in the package which the consumer found objectionable. This indicates that the U. S. grades are probably satisfactory as the device which producers or other marketing agencies may use in preparing their products for the consumers' use.

Defects may remain in packages because, in the process of sorting and packing, it is difficult to remove all of them. A percentage of tolerance in grades seems necessary because in the handling of a low-priced commodity, as potatoes, it is often commercially impractical to remove all the defects. A tolerance is also desirable for contractual arrangements between buyers and sellers because some damage occurs in shipment. When packaging potatoes for retailers to sell to consumers on the basis of high quality, however, the goal should be that of removing as many defects as possible.

Experience of many shippers in the packing and shipping of potatoes has indicated that the defects can be held in check to the extent that most of the potatoes upon arrival at the market will be well within the limits of tolerance. Such packing, if generally practiced, would contribute materially to the satisfaction of consumers as well as reducing some of the rehandling costs of marketing.

Adaptability of United States Grades

In evaluating the usefulness of the Federal grades for potatoes, producers and shippers should recognize the fact that these were constructed in such a way that they would be useful in a large number of areas and under a great variety of conditions throughout the United States. Interpretation of the grades, of course, must be left to the determination of the trained personnel operating within the service. The determination of the conditions, such as proper light and accessibility of the product for sampling, under which inspections may be made also must be left to the inspection service.

Growers in most areas thus find that the standard for U. S. No. 1 potatoes is generally applicable to the conditions under which they produce and pack their crops. In areas, however, where production is more specialized and where growers and packers have more facilities and experience for grading their crops, it may be desirable to pack well above the minimum requirements of this grade. In Maine, for instance, some attention has already been paid to this problem as indicated by the fact that a considerable volume is graded as U. S.

No. 1, size A, and U. S. No. 1, 2-inch minimum. In both of these grades, however, there is permissible a wide variation in sizes.

Standardization is one of the most desirable attributes of a perishable commodity. A high degree of standardization signifies that for important factors, such as size and percentage of defects, each carlot closely resembles every other carlot, and each package within the carlot closely resembles the average for the lot as a whole. When standardization of this kind has been accomplished and takes into account preferences of consumers, buying and selling will be facilitated. In the first place, the product will meet the consumers' requirements, and, therefore, be particularly desirable to dealers. In the second place, with standardization along these lines, losses, because of rejections of deliveries, will be minimized. These objectives in standardization are the ones toward which producers should be working, and objectives in which they are likely to be served best by cooperative marketing associations. It is necessary, however, that producers recognize the importance of a highly standardized product in their marketing program. If they do recognize this importance, they can adopt a policy of proper grading as one of the major parts of their marketing program. Having adopted such a program, the Inspection Service can be of assistance in putting the program into practical and effective operation. To accomplish this, the marketing organization must be willing to follow a consistent standardization policy and develop the necessary coordination with the Inspection Service to carry it out. If the attitude or point of view is that of packing to the limit of tolerances permitted under the grade, the inspector immediately is forced into a role similar to that of a referee, working between the buyer and the seller. His services under such conditions necessarily are limited to those of operating in the settlement of disputes and the maximum benefits that might result from his operations in improving the quality of potatoes are not obtained. Growers could enlist the cooperation of the Inspection Service by adopting a progressive policy toward grading and packing methods, in which case growers and shippers would be served better because the inspections would provide a product more satisfactory to buyers and consumers.

One of the more important adaptations in the United States standards is that producers in an area may set up specifications for grades, using the definitions and interpretations of the Federal standards, but reducing the tolerances and variations in size. Refinements, such as these, would result in better quality and greater standardization in lots and in packages, and the inspection certificate issued under these conditions would provide a better description of the potatoes. When this use of the service is made in connection with brands or

trade-marks and inspections are made by the trained employees of the Federal-State Inspection Service, the brands will gain character and standing throughout the industry. Producers of potatoes in Maine and their cooperative marketing associations should investigate the possibility of the development of such a procedure for their crops.

The use of the inspectors of the Fruit and Vegetable Inspection Service has an added value in that it provides a disinterested and equitable service for individual members of the cooperative marketing association. The inspector determines whether or not an individual member's delivery is acceptable under the trade-mark and brand of the association, and the management is relieved of the responsibility of making this decision. This decreases membership problems which arise from delegation to the management of this function.

When a large organization engages in the standardization of products, more efficiency in the use of the services of inspectors may follow if the service is placed on a contract basis, thereby making the inspector's services available to the organization continuously. If work within the organization is carefully planned so that the inspector is not required to spend too much of his time in traveling from place to place, the cost per inspection of using the service may be considerably decreased. An organization requiring consistent use of the inspection service over a considerable period of time should investigate the possibilities of this use of the inspection service for the purpose of making its own product more satisfactory to its customers and its operations more satisfactory to its members.

Consumer Preference as a Basis for Grades

Outstanding among the preferences of consumers was that for uniform size. (Fig. 31.) Over 71 percent of those interviewed in March indicated that a wide range in size in an individual package was not desirable. Of about equal importance was the preference for certain sizes of potatoes. Of about 74 percent of the consumers reporting a definite preference for size for baking, almost 63 percent preferred them to be $2\frac{1}{2}$ inches or over, whereas over 10 percent preferred them less than $2\frac{1}{2}$ inches in diameter. Very few of the consumers reported a preference for potatoes for any use as small as 2 inches in diameter, and almost as few reported a preference larger than 3 inches. More consumers reported preference of size for baking potatoes than for any other use, and most consumers reported as satisfactory a range in size not exceeding $\frac{1}{2}$ inch in diameter.

These preferences for uniform size and for potatoes of medium size were important since it has not been the practice of most producers to size potatoes in this way. Producers should carefully review

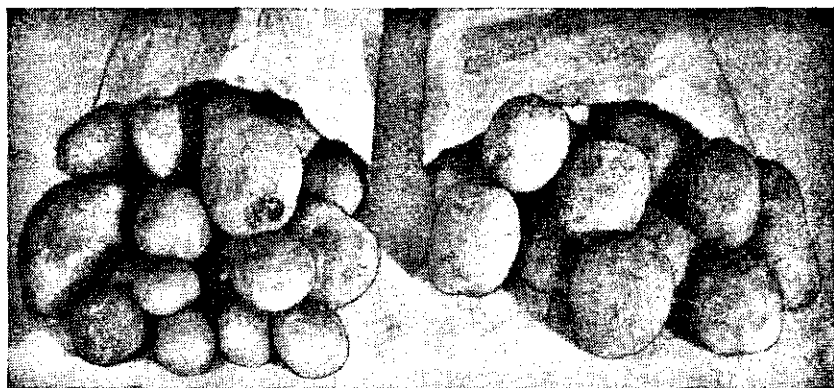


FIGURE 31.—Variation in consumer packages of potatoes. Two peck packages bearing the same brand and purchased in the same retail store at the same price early in April 1940. One is badly sprouted and averages small in size; the other is relatively clean and of acceptable size. A consumer satisfied with one would rarely be satisfied with the other.

their packing procedure and study the costs which are likely to be incurred in putting up packages for consumers in such a way that these sizes would become available to those wishing to pay average or slightly higher prices for them. Potatoes not so carefully selected as to size should be offered for sale at lower prices, in view of the fact that prices at which a large volume can be sold can not be materially above the average for the market.

Based on other reports of preferences by consumers, potatoes to be sold at premium prices should, if possible, be clean and bright, although the preferences for clean and bright potatoes were not so marked as those for properly sized and uniform potatoes. The fact remains that the proportion of families reporting preferences, with reference to uniformity, size, cleanness, and brightness, increased as the family income increased, pointing to the fact that consumers who have these preferences in the largest degree are also those consumers who are best able to pay for them.

In the matter of cooking qualities, consumers prefer potatoes that are dry and mealy. This is probably directly related to the strong preference for potatoes for baking. Dryness and mealiness are largely variety characteristics, and producers should take account of them insofar as practical by producing varieties in which these characteristics are inherent.

The research showed a lack of standardization in consumer packages, both in sizes and in defects. It also showed many consumers making personal selection from bulk lots of potatoes to satisfy their family requirements. It indicated that consumers prefer a package closely sized and that most of them prefer potatoes from $2\frac{1}{4}$ to 3

inches in diameter. It further indicated that careful removal of potatoes having defects as described in connection with the U. S. No. 1 grade would increase consumer satisfaction. Consideration of a grading program should take these preferences into account. Such a program would embrace the following ideas:

1. Sizing of table stock for use in brands for sale in large volume from a minimum of $2\frac{1}{4}$ inches to a maximum of 3 inches in diameter, using the present definition for damage under the U. S. No. 1 grade, but packing to a lower tolerance limit in order that the 6 percent tolerance would rarely be exceeded in any bag at destination.

2. A grade sized under $2\frac{1}{4}$ inches in diameter for sale where dictated by price competition.

3. The packing separately of potatoes over 3 inches in diameter for sale to restaurant trade and in cases in which special demand recommends them.

4. The packing of "Bakers," sized from $2\frac{1}{4}$ to $2\frac{3}{4}$ inches or from $2\frac{1}{2}$ to 3 inches, and removing all defects possible from these two premium grades.

Strict control of grading should be exercised. It is important that buyers have complete confidence in the grades, since this practice will reduce selling costs and losses occasioned by refusal of buyers to accept deliveries.

APPENDIX—SAMPLING PROCEDURE

THE AREA sampled included the city of Boston and the 13 cities and towns in the Boston metropolitan district which, according to the State census of 1935, had a density of population of more than 5,000 persons per square mile. The population, land area, and persons per square mile for each of the selected cities and towns as well as for the sampling area as a whole are shown in table 79. With approximately 1,500,000 persons living in an area of 105 square miles the average density of population was somewhat more than 14,000 persons per square mile, but there was considerable variation ranging from approximately 5,000 in Melrose to more than 25,000 in Somerville. Boston proper had close to 19,000 persons per square mile in 1935.

Shaded areas in figure 32 show that, with the exception of Brookline, all the cities and towns with more than 5,000 persons per square mile were located north of Boston proper. The selection of these suburbs resulted in a fairly compact sampling area as compared with the entire Boston metropolitan district and permitted a larger number of schedules to be gathered with the resources available to the project.

For consumption of potatoes the family was considered the most feasible unit of measurement. The number of family records taken in each of the cities and towns was in proportion to the number of families in the entire area of study. For example, 53.5 percent of the total number of families within the area sampled were located in

TABLE 79.—Population and density of population of cities and towns in sampled areas—1935 census

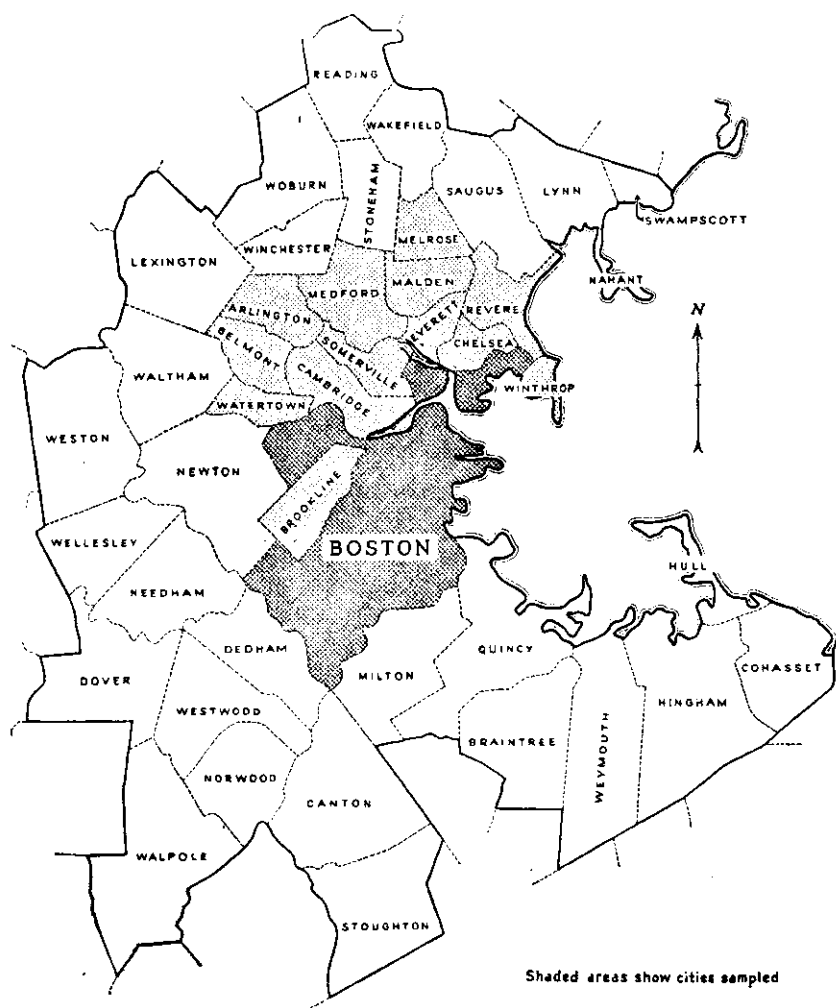
City or town	Population	Land area	Persons per square mile	City or town	Population	Land area	Persons per square mile
	<i>Number</i>	<i>Square miles</i>	<i>Number</i>		<i>Number</i>	<i>Square miles</i>	<i>Number</i>
Arlington.....	38, 539	5. 18	7, 440	Medford.....	61, 444	8. 21	7, 484
Belmont.....	24, 831	4. 59	5, 410	Melrose.....	24, 256	4. 73	5, 128
Boston.....	817, 713	43. 18	18, 937	Revere.....	35, 319	5. 95	5, 946
Brookline.....	56, 319	6. 62	7, 601	Somerville.....	100, 773	3. 93	25, 642
Cambridge.....	118, 075	6. 25	18, 892	Watertown.....	35, 827	4. 06	8, 824
Chelsea.....	42, 673	1. 86	22, 942	Winthrop.....	17, 001	1. 55	10, 968
Everett.....	47, 228	3. 36	14, 056				
Malden.....	57, 277	5. 08	11, 275	Total or average.....	1, 471, 275	104. 55	14, 072

Boston; consequently, 53.5 percent of the records were taken in Boston.

Locations were selected from the city directories by the use of "Tippet's Random Numbers." Each location was the nucleus of four consumer records. Eight records per day were considered a reasonable number for each enumerator on this basis. For each location there was a specific address; the enumerator then selected three additional addresses according to a definite pattern. Starting from the key location, he was instructed to take the second record two blocks north, the third two blocks east of the second, the fourth two blocks south of the third.

This plan counteracted any tendency on the part of an enumerator to confine his activity to a very small area for each series of four records. There may have been some bias toward one type of dwelling; also, records could not always be obtained at all contacts. Whenever refused, the enumerators were instructed to take the next dwelling, etc., until a record was eventually obtained. These refusals, however, did not tend to move the enumerators out of the area set up in the pattern of contact. Each man was responsible for the selection of families to replace those where there was no response to his call or where the consumer would not cooperate in completing a record. Telephone contacts were made with a few consumers whose names appeared on the records, to check the activity of the enumerators. The enumerators were licensed Federal-State fruit and vegetable inspectors, qualified to apply United States standards in classifying potatoes on hand in homes of Boston consumers. These men were selected as enumerators because, understanding quality and grade terminology, it was possible for them to standardize consumer responses more precisely. The interview was conducted in the home over the remaining part of the last purchase of potatoes. This served further to standardize responses, particularly with respect to preferences for sizes and the recognition of defects.

FIGURE 32.—BOSTON METROPOLITAN DISTRICT.



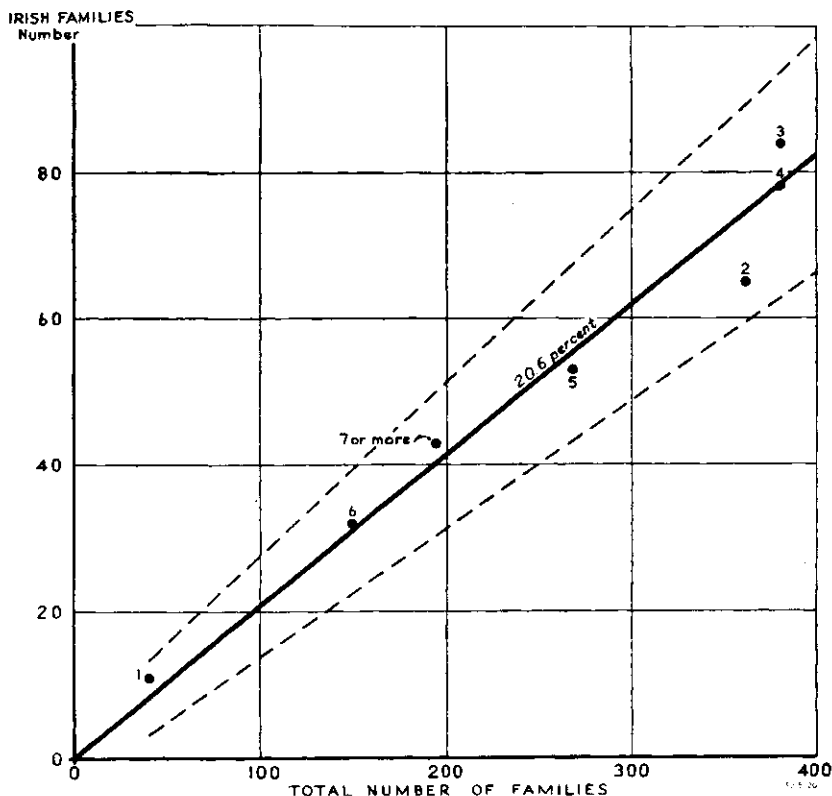
The Native White, the Irish, Italian, Jewish, and Negro groups, from the standpoint of number, were the most important race or nationality groups in Boston and nearby communities. Since it was assumed that the consumption of potatoes would differ among these groups, the enumerators were asked to classify the families interviewed according to the race or nationality of the head of the family. It was also assumed that the number of generations in this country was not important if nationality habits and customs persisted; therefore, an Italian or Jewish family of the second or third generation in this country which retained its racial or national traits was classified

as Italian or Jewish—not as Native White.³¹ The groups designated were Irish, Italian, Jewish, Negro, and Unclassified White. The last classification included the Native Whites, nationalities other than the predominating groups given above, and some White families who refused to admit foreign origin.

Under "Size of Family" were included all persons in each household with the exception of infants not yet old enough to eat potatoes. Records were not taken of families which included more than two roomers or boarders, since it was considered that such a household was not a typical family.

Family income was a third important population factor because it had a direct influence upon consumer buying habits. Weekly

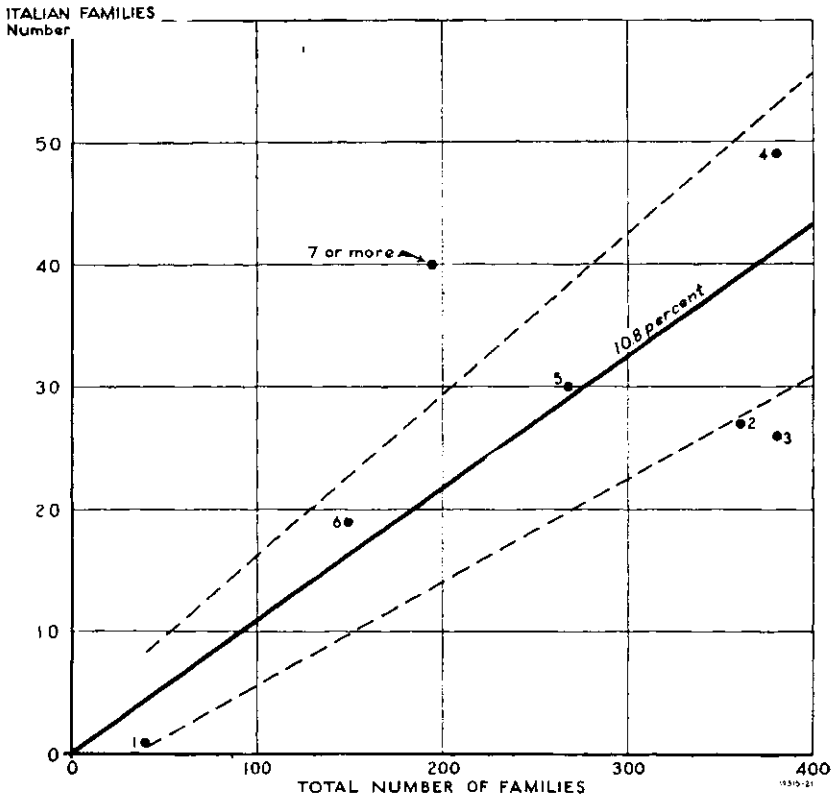
FIGURE 33.—IRISH FAMILIES, BY SIZE OF FAMILY GROUP, AS RELATED TO TOTAL FAMILIES REPORTING THE USE OF POTATOES.



Irish Families Were 20.6 Percent of the Total Reporting.

³¹ These lived in sections of the city where the group characteristics predominated and gave their information to the enumerator as a part of the nationality group.

FIGURE 34.—ITALIAN FAMILIES, BY SIZE OF FAMILY GROUPS, AS RELATED TO TOTAL FAMILIES REPORTING THE USE OF POTATOES.



Italian Families Were 10.8 Percent of the Total Reporting.

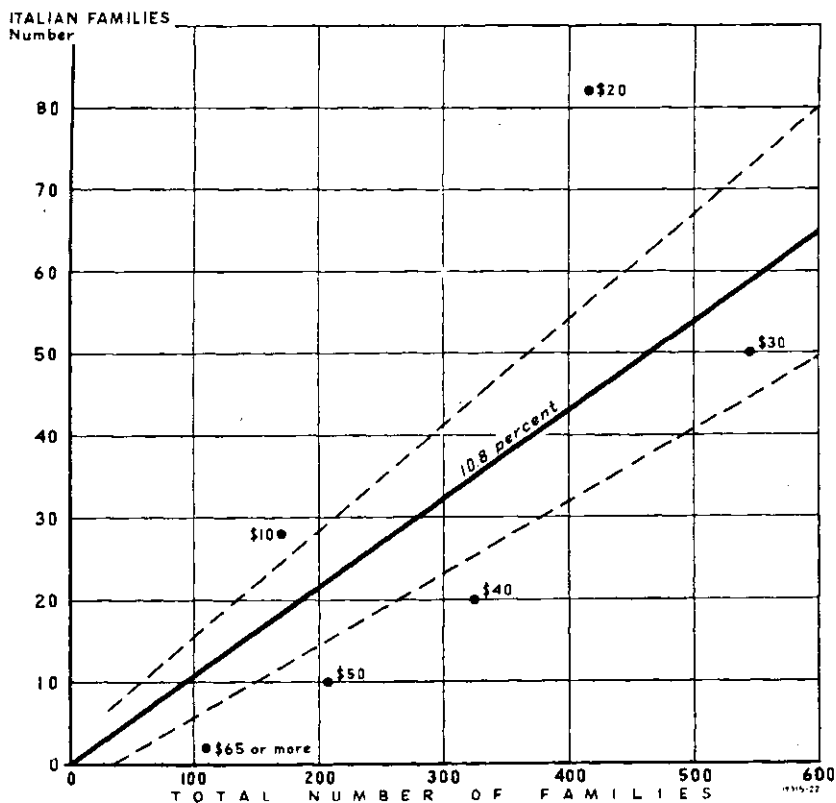
family income, as used in this study, was defined as the salary or wages of the head of the family, plus any other items regularly made available for current living expenses. The monthly rental figure obtained by the enumerators provided a means of estimating weekly family income in those instances when this information was not given directly.

Data were gathered in four complete and separate samples from the population described in figure 37 and table 79. This procedure provided check data for both the sampling procedure and the results of the survey. Samples one and two were taken from March 4 to April 6, 1940. In most respects Chi Square tests indicated that these two samples could be considered homogeneous, and they were combined. Samples three and four were taken from June 1 to June

29, 1940. Although these two samples were homogeneous insofar as population characteristics were concerned, in many ways they were not so with respect to the product attributes being studied, and, therefore, were frequently presented in several parts showing these differences where they existed. The sampling method used was particularly adaptable to pointing out seasonal changes which occurred in the progress of the study.

Chi Square tests were used extensively to judge homogeneity of the various parts of the sample as compared with each other. A comparison of each of the four samples with the total of all of them with reference to the number of persons reporting in each race or nationality group is shown in table 80. Using a probability of 0.05 as roughly indicative of two standard deviations, table 80 shows that the samples on a race or nationality basis were all satisfactorily

FIGURE 35.—ITALIAN FAMILIES, BY AVERAGE WEEKLY INCOME GROUPS, AS RELATED TO TOTAL FAMILIES REPORTING USE OF POTATOES.



in agreement with the total for all four samples and may be assumed to have been drawn from a population represented by that total. Since the selection of the locations was by random procedure, this agreement between samples supports the probability that the locations themselves represent a statistically reliable basis for study of the populations sampled.

A comparison of the four samples on the basis of number of persons in the family is shown in table 81. Here, using a probability of 0.05 as a measure of the limit of satisfactory agreement, it is seen that the third sample barely meets this requirement. The differences show that the reason for this lies mostly in the inclusion of too many families of one and too few families of four. Taken as a whole, the samples conform to the usual rules of acceptability of random samples.

A comparison of the "goodness of fit" of these four samples on the basis of family incomes is shown in table 82. On this basis, although previous tests indicated that samples one and two, as well as samples three and four, were to be considered as homogeneous when compared with each other, the March and June aspects of the samples were different. The authors are of the opinion that the seasonal aspects of employment, as well as the fact that a national defense program was beginning to get under way, caused an actual change in the income

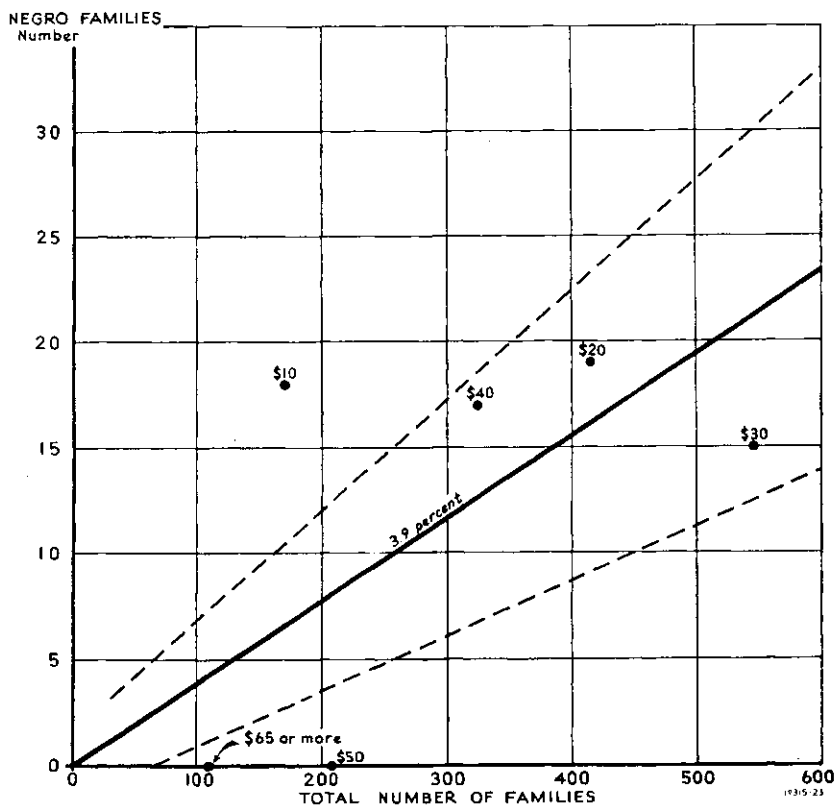
TABLE 80.—*Calculation of Chi Square for 4 samples of Boston families, by race or nationality groups, March and June 1940*

Race or nationality	Sample 1		Sample 2		Sample 3		Sample 4		Total
	Actual	Expected	Actual	Expected	Actual	Expected	Actual	Expected	
Irish	170	190.32	196	194.01	191	167.59	148	153.08	705
Italian	93	90.44	99	92.18	80	79.64	63	72.74	335
Jewish	47	50.75	56	51.74	40	44.69	45	40.82	184
Negro	34	34.02	35	34.67	26	29.95	31	27.36	126
Unclassified white	535	513.47	510	523.40	437	452.13	420	413.00	1,902
Total	879	879.00	896	896.00	774	774.00	707	707.00	3,256
DIFFERENCE									
Irish	-	20.32	+	1.99	+	23.41	-	5.08	.....
Italian	+	2.56	+	6.82	+	.36	-	9.74	.....
Jewish	-	3.75	+	4.26	-	4.69	+	4.18	.....
Negro	-	.02	+	.33	-	3.95	+	3.64	.....
Unclassified white	+	21.53	-	13.40	-	15.13	+	7.00	.....
CHI SQUARE									
Irish	2.170		0.020		3.270		0.169		5.629
Italian .....	.072		.505		.002		1.304		1.883
Jewish .....	.277		.351		.492		.428		1.548
Negro .....	.000		.003		.521		.484		1.008
Unclassified white .....	.903		.343		.506		.119		1.871
Total	3.422		1.222		4.791		2.504		11,939
n=	4		4		4		4		12
P=	0.30 to 0.50		0.80 to 0.90		0.30 to 0.50		0.50 to 0.70		0.30 to 0.50

characteristic of the population of Boston between March and June, increasing materially the number of families receiving an income of about \$40 per week in the latter month.

Although Chi Square analysis was used liberally throughout the process of analyzing the sampling material presented, another type was employed on certain parts of the first and the second sample, as illustrated in the following. This procedure, although not identical with that of Chi Square, is yet so similar that in many cases its results may be substituted, for all practical purposes. Table 83 shows the percentage breakdown of the various race or nationality groups in the first and second samples. It shows, for instance, that 20.6 percent of the families enumerated were of Irish descent, that 10.8 percent were Italian, that 5.8 percent were Jewish, 3.9 percent were Negro, and the great bulk of the sample, or 58.9 percent, were

FIGURE 36.—NEGRO FAMILIES, BY AVERAGE WEEKLY INCOME GROUPS, AS RELATED TO TOTAL FAMILIES REPORTING THE USE OF POTATOES.



Negroes Were 3.9 Percent of the Total Reporting.

TABLE 81.—*Calculation of Chi Square for 4 samples of Boston families by number of persons per family, March and June 1940*

Persons in family	Sample 1		Sample 2		Sample 3		Sample 4		Total
	Actual	Expected	Actual	Expected	Actual	Expected	Actual	Expected	
1.....	16	25.38	24	25.87	33	22.34	21	20.41	94
2.....	188	179.80	174	183.27	163	158.32	141	144.61	666
3.....	188	201.12	193	205.01	192	177.10	172	161.77	745
4.....	182	174.94	199	178.32	131	154.04	136	140.70	648
5.....	124	127.15	144	129.62	98	111.96	105	102.27	471
6.....	80	77.21	69	78.70	75	67.99	62	62.10	286
7.....	46	41.84	42	42.65	36	36.85	31	33.66	155
Over 7.....	55	51.56	51	52.56	46	45.40	39	41.48	191
Total.....	879	879.00	896	896.00	774	774.00	707	707.00	3,256
DIFFERENCE									
1.....	-	9.38	-	1.87	+	10.66	+	0.59	.....
2.....	+	8.20	-	9.27	+	4.68	-	3.61	.....
3.....	-	13.12	-	12.01	+	14.90	+	10.23	.....
4.....	+	7.06	+	20.68	-	23.04	-	4.70	.....
5.....	-	3.15	+	14.38	-	13.96	+	2.73	.....
6.....	+	2.79	-	9.70	+	7.01	-	.10	.....
7.....	+	4.16	-	.65	-	.85	-	2.66	.....
Over 7.....	+	3.44	-	1.56	+	.60	-	2.48	.....
CHI SQUARE									
1.....	3.467		0.135		5.086		0.017		8.705
2.....	.374		.469		.138		.090		1.071
3.....	.856		.704		1.254		.647		3.461
4.....	.285		2.398		3.446		.157		6.286
5.....	.008		1.595		1.741		.073		3.417
6.....	.101		1.196		.723		.000		2.020
7.....	.414		.010		.020		.210		.654
Over 7.....	.230		.046		.000		.148		.424
Total.....	5.735		6.553		12.408		1.342		26.038
n=.....	7		7		7		7		21
P=.....	0.50 to 0.70		0.30 to 0.50		0.05 to 0.10		0.98 to 0.99		0.20 to 0.30

classified as Native White, including a few of unclassified White origin. With reference to the 20.6 percent of the total population sampled which were classified as Irish, the problem is raised, does the 20.6 percent distribution of the Irish hold true within each size-of-family group?

Figure 33 was drawn in such a way that the solid line represents 20.6 percent of the number of families indicated at the base of the table. For instance, for 400 families, 20.6 percent represented about 82 Irish families, and for 200 families, 20.6 percent would include about 41 Irish families. The two dotted lines in figure 33 are drawn in such a way that they represent two standard deviations from the solid line. These lines were drawn by applying the general sampling

formula² for standard deviation of a sample, namely, $2\sqrt{\frac{pq}{n}}$. If, in the scatter diagram, the location of a point representing a family group fell so close to the solid line as to be inside of the dotted line,

² See Yule, G. U. and Keudall, M. G. *An Introduction to the Theory of Statistics*. 11 ed. 1937, ch. 19.

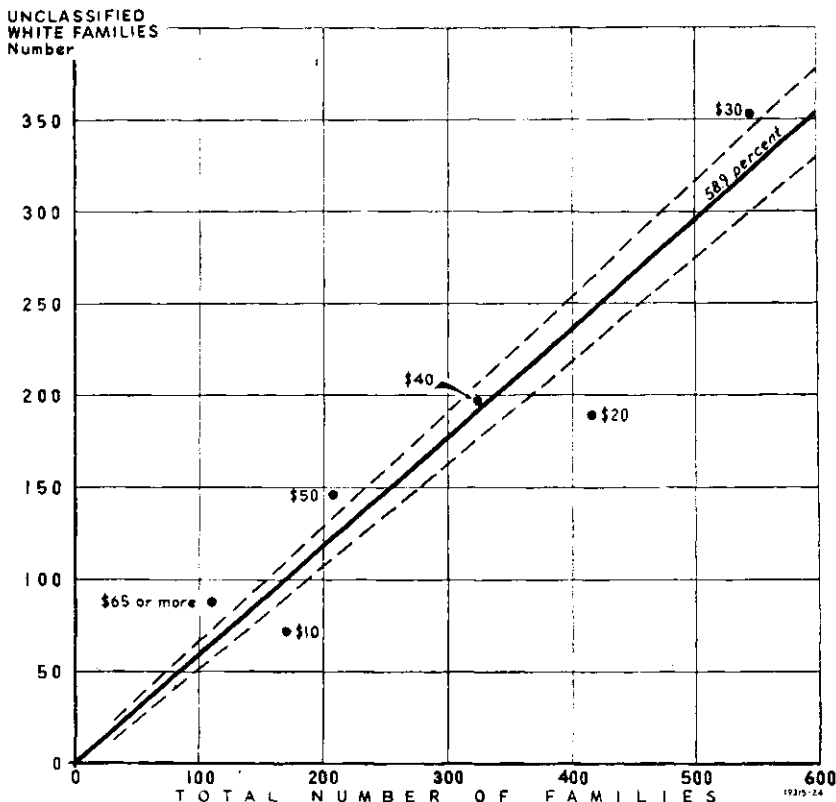
then the difference would not be considered as greater than one which might be expected to result from the use of sampling methods. Figure 33 shows that for all family sizes tabulated, the Irish were in sufficiently close agreement with the total number of family sizes for the entire sample, so that the differences could be considered merely those fluctuations which occur through the use of sampling procedure and there is no reason to suppose that in matters of family size the Irish are any different from the average of the total population of the area.

In figure 34, the same type of analysis was applied to Italian families which comprised 10.8 percent of the total sample. Here the results were different, since among the Italians there is a tendency for small families to appear in less-than-average proportion, while families of 7 or more were present in more-than-average proportion. The importance of this figure is that it shows that wherever size of family is important in the analysis, Italian families are likely to be represented in less-than-average proportion among small families,

TABLE 82.—*Calculation of chi square for four samples of Boston families by family income groups, Boston, March, and June 1940*

Weekly family income	Sample 1		Sample 2		Sample 3		Sample 4		Total
	Actual	Expected	Actual	Expected	Actual	Expected	Actual	Expected	
\$15 or less.....	86	73.16	84	74.58	49	64.42	52	58.84	271
\$16-\$25.....	190	188.71	226	192.35	151	166.16	132	151.78	699
\$26-\$35.....	260	261.32	286	266.38	214	230.11	208	210.19	968
\$36-\$45.....	160	188.71	165	192.35	200	166.16	174	151.78	699
\$46-\$55.....	114	103.93	94	105.95	97	91.50	80	83.60	385
\$56-\$75.....	54	48.86	30	49.81	52	43.03	45	39.30	181
\$76 or more.....	15	14.31	11	14.58	11	12.60	16	11.51	53
Total.....	879	879.00	896	896.00	774	774.00	707	707.00	3,256
DIFFERENCE									
\$15 or less.....	+	12.84	+	9.42	-	15.42	-	6.84	.....
\$16-\$25.....	+	1.29	+	33.65	-	15.16	-	19.78	.....
\$26-\$35.....	-	1.32	-	19.62	+	16.11	+	2.19	.....
\$36-\$45.....	-	28.71	-	27.35	+	33.84	+	22.22	.....
\$46-\$55.....	-	10.07	-	11.95	-	5.48	-	3.60	.....
\$56-\$75.....	+	5.14	-	19.81	+	8.97	+	5.70	.....
\$76 or more.....	+	.69	-	3.58	-	1.60	+	4.49	.....
CHI SQUARE									
\$15 or less.....	2.253		1.190		3.691		.795		7.929
\$16-\$25.....	.009		5.886		1.383		2.578		9.856
\$26-\$35.....	.007		1.445		1.128		.002		2.582
\$36-\$45.....	4.368		3.889		6.891		3.253		18.401
\$46-\$55.....	.976		1.348		.328		.155		2.807
\$56-\$75.....	.540		7.878		1.870		.827		11.115
\$76 or more.....	.033		.879		.203		1.752		2.867
Total.....	8.186		22.515		15.494		9.362		55.557
n =	6		6		6		6		18
P =	0.20 to 0.30		.....		0.01 to 0.02		0.10 to 0.20		.....

FIGURE 37.—UNCLASSIFIED WHITE FAMILIES, BY AVERAGE WEEKLY INCOME GROUPS, AS RELATED TO TOTAL FAMILIES REPORTING THE USE OF POTATOES.



Unclassified White Families Were 58.9 Percent of the Total Reporting.

and more-than-average proportion among families of 7 or more. Figure 35, again for Italian families, shows that this population group had a tendency toward low income because incomes of \$10 and \$20 per week occurred in more than average proportions for the population as a whole; whereas incomes of \$40, \$50, and \$65 were present in less-than-average proportions. These two figures show that large families and low incomes were characteristic of the Italian section of the Boston population.

Figure 36 shows that, like the Italians, the Negroes tended to have lower-than-average incomes, indicated by the fact that a larger-than-average proportion had incomes of only \$10 per week, whereas no Negro families reported incomes of \$50 per week or more. Figure 37 shows that the opposite is true for the unclassified Whites. Incomes

of \$50 or more were found in greater-than-average proportions, while incomes of \$10 and \$20 were found in less-than-average proportions.

TABLE 83.—*Number of families using potatoes classified by nationality and size of family groups*

Nationality	Persons in family							Total	Per-centage of total
	1	2	3	4	5	6	7 or more		
	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Percent</i>
Irish.....	11	65	84	78	53	32	43	366	20.6
Italian.....	1	27	26	49	30	19	40	192	10.8
Jewish.....	1	21	25	25	13	12	6	103	5.8
Negro.....	7	18	11	13	5	7	8	69	3.9
Unclassified white.....	20	231	235	216	167	79	97	1,045	58.9
Total.....	40	362	381	381	268	149	194	1,775	100.0

This type of analysis was applied to all the combinations of nationality, size of family, and income in the sample. In most instances, as in figure 33, no significant differences for individual groups was found. The important variations from this were those shown in figures 34 to 37. In addition, it was found that families of one tended to have low incomes; this is because families of one were very likely to be composed of single women with clerical occupations, or retired women unemployed.

In the third and fourth family samples, this procedure of analysis of the data was not used, but all population groups were subjected to similar Chi Square analysis with similar results.

Other Reports Based on This Study of the Marketing of Maine Potatoes

1. Hincks, Maynard A., *Marketing Maine Potatoes: A Preliminary Report of Consumer Preference for Potatoes in Boston, March 4 to April 6, 1940.* 33 pp. Maine Agr. Expt. Sta. Misc. Publ. 561. 1940.

2. Foelsch, Gertrude G., and Sprague, Gordon W., *Marketing Maine Potatoes: Purchase and Use of Potatoes and Substitutes in Homes of Boston Consumers: March 4 to April 6, 1940.* 40 pp., processed. FCA Misc. Rpt. 27. 1940. (Available for limited distribution.)

3. Hincks, Maynard A., and Sprague, Gordon W., *Marketing Maine Potatoes: Organization and Market Practices in Maine and Boston.* 29 pp., illus., processed. FCA Misc. Rpt. 31, 1940. (Available for limited distribution.)

4. Mumford, Herbert W., Jr., *Marketing Maine Potatoes: A Retail Distribution of Potatoes in the Boston Metropolitan Area, March 1940.* 42 pp., processed. FCA Misc. Rpt. 26. 1941. (Available for limited distribution.)

5. Foelsch, Gertrude G., *Marketing Maine Potatoes: Boston Retail Prices as Associated With Types of Packages, Retailers, and Consumer Incomes, February 26 to April 6, 1940.* 32 pp., processed. FCA Misc. Rpt. 36. 1941. (Available for limited distribution.)

6. Sprague, Gordon W., *Marketing Problems of Maine Potato Producers.* 12 pp., processed. FCA Misc. Rpt. 38. 1941. (Available for limited distribution.)

7. Hincks, Maynard A., Spangler, Raymond L., and Sprague, Gordon W., *Marketing Maine Potatoes: Damage in Selected Bags at Maine Shipping Points and in Boston Wholesale and Retail Markets.* 17 pp., processed. Misc. Rpt. 39. 1941. (Available for limited distribution.)

