

USE OF FROZEN FOODS IN OHIO



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EXPERIMENT STATION**

Wooster, Ohio

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by

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Introduction

Use of frozen foods, with the impetus given it by World War II, has assumed considerable importance in the United States food picture. Further advances will depend upon improvements in techniques, price, merchandising, and consumer acceptance.

Cold storage locker use for family storage of frozen foods generally preceded the freezing of foods for sale through commercial channels. However, in urban areas use of lockers was never great in relation to the population and sale of frozen foods through retail outlets has furnished the bulk of frozen foods used. In Ohio, additions to locker plant facilities reached their peak in 1946 and by 1949 the expansion amounted to only 10 percent of that for 1946. The fact that this expansion has practically stopped indicates that most of the increase in consumption of frozen foods in Ohio will likely be from more use of commercially frozen foods in urban areas, with some increase in food stored in home units.

The first phase of this study deals primarily with purchase of frozen foods by consumers in Ohio from commercial channels and their use of frozen foods from lockers and home units. The second phase, which was given somewhat less emphasis, concerned the merchandising of frozen foods through retail outlets. No account was taken of the use of such foods by restaurants and other eating places. The data were collected in late 1948 and 1949.

A total of 1,368 families were contacted in obtaining information concerning purchases and use of frozen food from their own storage. The sample was drawn so that it was representative of the entire population of Ohio. Information concerning merchandising of frozen foods was obtained from stores adjacent to areas where customers were interviewed. The number of stores contacted varied with the area. In rural areas it was possible to contact most of the nearby stores where the families were likely to make their purchases. In areas where a large number of stores were located near the consumer sample area, only a reasonable number of the stores were visited. In all, 330 stores were contacted.

Section I—CONSUMER ACCEPTANCE OF FROZEN FOODS

INFORMATION CONCERNING FAMILIES INTERVIEWED

Family size was determined on the basis of the number of persons who ate one or more meals per day at the family table. The average of 3.55 persons per family for all families interviewed is very close to the average size of families according to the 1940 Census. Most of the 139 families for which family size was not determined were in the large city classification. Farm families were considerably larger than any other group, while the small villages had the smallest families. Complete data on the number of families of each size for the families interviewed are given in Table 1.

Table 1.—Number of Families of Different Sizes Included in the Study Classified by Place of Residence.

Size of Family	Population Areas						Total
	50,000 and over	10,000 to 25,000	2,500 to 10,000	Incorporated 2,500 or less	Unincorporated Villages	Farm	
1	16	8	7	12	9	2	54
2	180	29	30	27	30	29	325
3	179	27	26	21	11	28	292
4	160	17	23	13	13	47	273
5	86	8	12	7	15	22	150
6	36	3	4	7	4	13	67
7	19	2	2	0	1	10	34
8	9	1	0	1	1	3	15
9	6	0	0	0	2	4	12
10	2	0	0	0	0	2	4
11	1	0	0	0	1	0	2
14	1	0	0	0	0	0	1
Not given	129	0	9	0	0	1	139
Total families	824	95	113	88	87	161	1368
Average per family	3.60	3.11	3.22	3.02	3.41	4.19	3.55

The number of families interviewed from each area was determined by the distribution of the population according to census figures.

The families were classified into five income groups for purposes of analyzing the effect of income on use of frozen foods. Rent or rent equivalent was used to indicate income. There was comparatively little difference in size of families in different income groups. This simplified the analysis by making it easier to isolate effect of

both size of family and income on consumption. Complete classification of families by income groupings and family size is given in Table 2.

TABLE 2.—Number of Families of Different Sizes Included in the Study Classified by Income as Determined by Rent or Rent Equivalence.

Number in Family	Income Classification					All Groups
	1 Lowest	2	Group 3 to	4	5 Highest	
1	14	24	12	2	2	54
2	31	117	98	47	32	325
3	32	107	93	30	30	292
4	36	84	79	42	32	273
5	18	60	40	17	15	150
6	13	23	20	4	7	67
7	5	11	10	6	2	34
8	4	7	2	2	0	15
9	1	3	3	3	2	12
10	1	2	1	0	0	4
11	0	0	2	0	0	2
14	0	1	0	0	0	1
Not Given	39	44	31	17	8	139
Total Families	194	483	391	170	130	1368
Average Family Size	3.68	3.34	3.52	3.58	3.55	3.55

Throughout the study where income groupings are made, the lowest income group is designated as Group 1 and the highest as Group 5.

When areas covered by the study are combined into two groups, rural and towns and cities of 2,500 and over, a variation from 3.68 for the average family size of rural areas to 3.50 for towns and cities over 2,500 was found. Of the total families visited 1,032 were in towns and cities of 2,500 and over and 336 families were located in rural areas. Rural families were somewhat larger than town and city families in each income group with a pronounced difference in the highest income group. In this latter group the rural family size averaged 4.1, while in the towns and cities over 2,500 it averaged 3.5.

In no case, where all frozen foods were taken into consideration, was there any significant difference between consumption of frozen foods by large families and small families on a per capita basis. For this reason no comparison will be made concerning consumption of frozen foods based on family size. Important differences were shown

when comparisons were made between income groups and between rural families and families in towns and cities over 2,500. In Table 3 is shown what percent of families, by income, use frozen foods.

TABLE 3.—Percent of Families Using and Percent Not Using Frozen Foods, Classified by Place of Residence and by Income.

	Residence		All Groups	Income Classification				
	Urban	Rural		1 Lowest	2	3 Group to	4	5 Highest
Use Frozen Food	57.6	61.3	58.5	35.6	50.1	67.0	70.0	83.1
Do Not Use	42.4	38.7	41.5	64.4	49.9	33.0	30.0	16.9

GENERAL INFORMATION CONCERNING USE OF FROZEN FOODS

Why Some Families Did Not Use Frozen Foods.

Of all families questioned, 41.5 percent had not used frozen foods during the last year. Several reasons were given for this and are set forth in table 4.

TABLE 4.—Percent of Families Not Using Frozen Foods Giving Various Reasons for Not Using Them, by Place of Residence and by Income.

Reason given for not using frozen foods	Residence		Income Classification					Aver. of All Groups
	Urban	Rural	Group					
			1 Lowest	2	3	4	5 Highest	
Never tried them	21.6	17.6	31.5	20.6	15.5	14.7	5.3	20.3
Don't like them	14.4	10.5	12.4	13.6	11.2	14.7	21.0	13.1
Too expensive	11.3	11.8	12.4	12.1	12.1	5.9	5.3	11.5
Do own canning	9.7	34.6	7.9	20.1	21.6	17.6	15.8	17.8
Never acquired habit	5.3	7.2	1.1	5.6	8.6	14.7	—	5.9
Not conveniently available	2.2	10.5	1.1	8.4	2.4	2.9	—	4.9
Prefer fresh and canned	8.2	2.0	4.5	2.3	10.3	14.7	15.8	6.2
Lack of home storage facilities	3.1	0.6	4.5	1.9	2.6	—	—	2.3
No reason given	24.2	5.2	24.6	15.4	15.5	14.8	36.8	18.0

Habit appears to be an important reason for not using frozen food. Probably the two most difficult barriers to be overcome by the frozen food trade in increasing sales are those of changing the viewpoint of families not liking frozen foods and those with a preference for fresh or canned products. It must be remembered that the families represented here are the 41.5 percent who were not using any frozen foods. Increasing consumption by those families now using them is a different problem.

Regular and Special Occasion Use of Frozen Foods.

The families were asked whether they used frozen foods regularly or only on special occasions. This classification was made on the basis of use throughout the year. The size of family was not a factor as to whether they were regular or special occasion users. Location and income groups did, however, influence their use.

Of all the users of frozen foods, 50.2 percent said they were regular users. In towns and cities of 2,500 and over, 47.2 percent use frozen foods regularly, with 58.7 percent in rural areas.

Families with larger incomes use frozen foods more regularly than those in the lower income groups. In Group I only 34.8 percent used frozen foods regularly; in Group 2, 39.7 percent; in Group 3, 54.6 percent; in Group 4, 57.5 percent and in Group 5 the percentage was 64.8 percent.

Length of Time Families Had Used Frozen Foods.

Use of frozen foods varied from one month to 15 years. For purposes of analysis, fractions of a year were considered as a year.

The length of use indicated considerable relation to family income. In Group 5, 51.5 percent of the families had used frozen foods 5 years and over, while in Group 1 only 14.3 percent had used frozen foods for this length of time. Average time for all families was 3.71 years.

Regular users of frozen foods had used them for a longer period than the special occasion users. Of the regular users, 44 percent had used them 5 years and over, while with special occasion users only 24.4 percent had used them that long. Of the special occasion users 53.9 percent had used frozen foods for not more than two years, while only 31.2 percent of regular users had purchased them for the same period.

Present Compared to World War II Use of Frozen Foods

During the years of World War II use of frozen foods increased rapidly. Some of this growth was undoubtedly due to the war rationing since frozen fruits, vegetables and fish were not rationed. However, frozen foods were not available in large quantities before the war and at the time of the outbreak of the war they were gaining in importance. How much of the gain was due to the war is not known, but one method of measuring the war effect is to determine the present use as compared with use during the war. To compare the two periods, families were asked to indicate how

their use compared to the war years. No significant difference by families of different income was noted, but place of residence made some difference. The percent of families that indicated the use of more, less, or the same amount of frozen foods as they used during the war by family residence is shown in Table 5.

TABLE 5.—Percent of Rural and Urban Families Classified by Their Present Use of Frozen Food Compared to Its Use During World War II.

Amount	Urban	Rural	Total
More	56.5	73.8	60.8
Less	5.6	5.0	5.5
Same amount	37.9	21.2	33.7
Total	100.0	100.0	100.0

A larger percent of the rural families had increased their use of frozen foods since the war than was indicated by the urban families. In both groups only a small percentage now use less frozen foods than they did during the war years.

The data indicate that the use of frozen foods had not come entirely as a result of the lack of availability of other foods, as occurred during the war, but that the families continued to increase consumption even after other foods became available.

FROZEN FOOD PURCHASED AT RETAIL

Planned vs. Impulse Purchases

The intent of this question was to find how many of the users of frozen foods plan their purchases before they go to the store and how many buy frozen foods just because they see the display at the store.

Of these users, 38.7 percent bought frozen foods after they saw the display at the store and not because of any preplanning of their meals. Location of the families and their size had no relation to factors of planned or impulse buying. Income of the family was an important factor. In Group 1, 46 percent planned to buy frozen foods before going to the store; in Group 5 the percentage was 72.2.

Regular users indicated that they did more planning in buying frozen foods than did the special occasion users. Of the regular users 82.8 percent planned to buy; only 41.2 percent of the special occasion users did.

Frozen Food Purchased for Current Consumption

A total of 33 different frozen commodities were purchased at retail stores for current consumption by families interviewed. Ice cream was not considered in this study. In order of importance the 33 commodities were:

- | | | |
|----------------------|----------------------|-------------------|
| 1. Peas | 12. Mixed vegetables | 23. Mixed Fruits |
| 2. Limas | 13. Asparagus | 24. Rolls |
| 3. Strawberries | 14. Succotash | 25. Raspberries |
| 4. Corn | 15. Orange juice | 26. Blackberries |
| 5. Broccoli | 16. Peas and carrots | 27. Rhubarb |
| 6. Peaches | 17. Applesauce | 28. French Fries |
| 7. Spinach | 18. Squash | 29. Beef steak |
| 8. Green Beans | 19. Pineapple | 30. Boysenberries |
| 9. Fish | 20. Cherries | 31. Chop suey |
| 10. Cauliflower | 21. Poultry | 32. Biscuits |
| 11. Brussels sprouts | 22. Apricots | 33. Pumpkin |

The first 11 of the commodities represented 78.1 percent of the commercially frozen food consumption of the families interviewed. The percent which each represents of the total frozen food consumption by income groups is shown in Table 6.

TABLE 6.—Percent of Total Frozen Food Used Which Was Represented by Each of the Eleven Most Important Items, in Each of the Income Groups.

Food Item	Income Classification					Average
	1	2	Group 3	4	5	
	Lowest		to		Highest	
Peas	26.9	19.0	20.2	19.1	12.5	19.2
Limas	8.0	10.0	13.1	14.0	19.9	12.9
Strawberries	12.0	12.3	10.3	9.0	8.1	10.5
Corn	8.6	11.6	10.2	5.2	6.6	9.2
Broccoli	2.9	4.7	4.4	5.3	7.3	4.9
Peaches	4.3	4.5	3.7	5.0	5.4	4.4
Spinach	3.4	3.6	4.4	3.0	4.6	3.9
Green Beans	2.6	4.2	3.3	3.9	5.7	3.9
Fish	4.3	5.2	2.7	2.2	1.4	3.2
Cauliflower	2.9	2.4	3.9	3.0	2.2	3.0
Brussels sprouts	2.9	1.8	3.4	2.6	5.1	3.0
Total for 11 commodities as a percent of all commodities reported	78.8	79.3	79.6	72.3	78.8	78.1

Four leading commodities, peas, limas, strawberries and corn, constitute 51.8 percent of all frozen food, purchased at retail.

The amount of each commodity purchased at the retail store was determined by arriving at the number of packages of frozen foods purchased by each family over the four-week period prior to the interview. A four-week period was taken rather than one week to obtain a more representative figure.

Income was a definite factor determining the amount of frozen food purchased. Consumption of lima beans and broccoli increased sharply as income increased. Other commodities were not affected as much by the increase in income, fish being least affected. However, the total of the 11 commodities showed increases as income was increased. The per family consumption of the 11 leading frozen commodities purchased at the retail store for the different income groups during a four-week period is shown in Table 7.

TABLE 7.—Number of Packages of Frozen Food Purchased per Family at Retail over a Four-Week Period, for Each Income Group.

Food Item	Income Classification					Average
	1 Lowest	2	Group 3 to	4	5 Highest	
Peas	.48	.50	.84	.87	.57	.65
Limas	.14	.27	.54	.64	.91	.43
Strawberries	.22	.33	.43	.41	.37	.35
Corn	.15	.31	.42	.24	.30	.31
Broccoli	.05	.12	.18	.24	.33	.16
Peaches	.07	.12	.15	.23	.25	.15
Spinach	.06	.09	.18	.14	.21	.13
Green Beans	.05	.11	.14	.18	.26	.13
Fish	.07	.14	.11	.10	.06	.11
Cauliflower	.05	.06	.16	.14	.10	.10
Brussel Sprouts	.05	.05	.14	.12	.23	.10
Total 11 Commodities	1.39	2.10	3.29	3.31	3.59	2.62
Total 33 Commodities	1.76	2.65	4.13	4.58	4.56	3.35

In computing per family or per capita consumption, all families were included in the averages rather than just those who used them.

The total of the 11 leading commodities consumed by income Group 5 was 2.2 packages or 158 percent greater than for Group 1. For all 33 commodities the per family consumption in Group 5 was more than 2½ times that consumed by families in Group 1. Converting the average of all groups over a four-week period to the yearly basis, the average family was found to be consuming 43.55 packages per year. The average yearly per capita consumption was 12.3 packages. It is difficult to convert the number of packages to pounds because of the variation in the package size which ranges from eight ounces to more than one pound; however, the number of pounds would be slightly less than the number of packages.

When urban and rural location was considered a variation in consumption was noted. The number of packages of each of the 11

leading commodities purchased during the four-week period by urban and rural families is given in Table 8.

TABLE 8.—Number of Packages of Frozen Food Purchased per Family at Retail Over a Four-Week Period, by Urban and Rural Families.

Food Item	Urban Families	Rural Families
Peas	.69	.51
Limas	.46	.34
Strawberries	.38	.28
Corn	.35	.19
Broccoli	.20	.05
Peaches	.18	.07
Spinach	.15	.06
Green Beans	.15	.07
Fish	.12	.09
Cauliflower	.11	.07
Brussels Sprouts	.12	.03
Total 11 Commodities	2.91	1.76
Total 33 Commodities	3.76	2.19
Eleven Commodities as Percent of Total	77.3	80.2

The per family consumption of commercially frozen foods for the four-week period for the urban areas is more than 1.5 times that of the rural areas. These 11 commodities constitute 80.2 percent of the frozen foods purchased at retail in the rural area and 77.3 percent in the urban area. Since those percentages, 80.2 and 77.3, constitute the part of all commodities which the 11 leading commodities represent, the total per family consumption of commercially frozen foods is 3.76 packages for the urban areas and 2.19 packages for the rural areas for the four-week period.

Converting these totals to the yearly per family consumption, the urban families consume 48.88 packages per year and the rural families consume 28.47 packages. The yearly per capita consumption from retail sources was 13.97 packages for the urban users and 7.74 packages for the rural users based on average size families included in the study.

Reasons for Purchasing Frozen Foods Rather than Fresh Foods.

An effort was made to determine the reason families purchase frozen rather than fresh foods. Some of the families gave two or three reasons and each was tabulated separately. Most popular reason was "convenience" of frozen foods over fresh with "availability" given almost equal importance.

Reasons given for purchasing frozen rather than fresh foods are shown in Table 9.

TABLE 9.—Percent of Families Giving Various Reasons for Purchasing Frozen Foods Rather Than Fresh, by Place of Residence and by Regularity of Use.

Reason	Residence		Regularity of Use		All Users
	Urban	Rural	Regular Users	Occasion Special Users	
	Percent	Percent	Percent	Percent	Percent
Convenience	36.4	25.0	36.8	30.8	34.4
Availability	29.8	53.9	32.4	37.3	33.9
Quality	21.6	12.7	21.2	18.4	20.1
Economy	10.3	5.0	9.4	9.2	9.4
For a change	1.1	1.7	0.2	2.8	1.2
For a trial	.8	1.7	—	1.5	1.0
Total	100.0	100.0	100.0	100.0	100.0

“Convenience” was given as the most important advantage in cities while in the rural areas “availability” was mentioned more often. This probably is due to the fact that a limited supply of fresh foods are available in the rural areas during certain seasons of the year.

There was little relation between income and reasons given for use of frozen foods except that economy was mentioned more often by low income families than by those with higher incomes.

There was little difference between “regular” and “special occasion” users in advantages listed. This breakdown also is shown in Table 9.

Probably the most surprising fact brought out in this table is that approximately 20 percent of the families thought they got better quality than in fresh foods and more than 9 percent thought they were more economical than fresh products.

Reasons for Purchasing Frozen Foods Rather than Canned Foods

Families using frozen products were asked why they purchased them rather than canned foods. They gave the same reasons or advantages as for purchasing frozen food rather than fresh, but the number listing each advantage was much different. Quality was mentioned as an advantage by 70.0 percent of the families, leaving little doubt about users’ opinions of quality compared to canned foods. The percents of the families naming each advantage of

purchasing frozen foods rather than canned foods are shown in Table 10.

TABLE 10.—Percent of Rural and Urban Families Giving Various Reasons for Purchasing Frozen Foods Rather than Canned Foods.

Reasons	Urban	Rural	Total
Quality	68.2	77.9	70.0
Convenience	17.0	6.2	15.1
Economy	6.3	—	5.2
Availability	5.7	8.3	6.4
Just for a trial	1.1	2.1	1.0
For a change	1.7	5.5	2.3
Total	100.0	100.0	100.0

The difference in percentage of urban and rural families stating convenience as an advantage was a result of difference in effort necessary in traveling to and from the store. Those who stated economy apparently were comparing high-priced canned foods to frozen.

By income classification there was some change in the distribution of advantages listed. In income Group 1, 58.4 percent of the families said quality was the greatest advantage, while in income Group 5 it constituted 74 percent. "Convenience" was stated by 24.6 percent in the lowest income group, but in Group 5 by only 14 percent. The only explanation for this difference would be that since the lower income families use frozen foods less often than higher income families they would better appreciate the convenience and ease of preparation than those who use frozen foods more often. Table 11 points out the difference between special occasion and regular users in attitude toward use of frozen foods rather than canned.

TABLE 11.—Percent of Families Using Frozen Foods Regularly and of Families Using Them Only on Special Occasions Giving Various Reasons for Using Frozen Foods Rather Than Canned.

Reasons	Regular Users			Special Occasion Users		
	Urban	Rural	Total	Urban	Rural	Total
Quality	71.1	85.9	73.7	65.9	72.5	67.0
Convenience	16.3	8.5	14.9	17.7	1.5	14.8
Economy	6.2	—	5.1	5.9	—	4.9
Availability	5.8	4.2	5.5	6.8	8.7	7.2
Just for a trial	—	—	—	0.9	4.3	1.5
For a change	0.6	1.4	0.8	2.8	13.0	4.6
Total	100.0	100.0	100.0	100.0	100.0	100.0

Seventy percent thought quality of frozen foods better than canned but only 20.1 percent thought they were better than fresh. Economy was given little importance indicating that the majority of families still believe frozen foods more expensive.

USE OF LOCKERS AND HOME UNITS

In rural areas use of lockers and home units is greater than in urban areas. Since there is no extended use of lockers and home units for storage of commercially frozen foods it is expected that the concentration of such facilities is in areas where home-produced items are more abundant.

The number and percentage of the families in each of the areas renting lockers or owning home units is shown in Table 12.

TABLE 12.—Number and Percent of Urban and Rural Families Renting Lockers or Owning Home Units.

	Urban		Rural		Total	
	Number	Percent	Number	Percent	Number	Percent
Lockers	54	5.2	96	28.9	150	11.0
Home Units	36	3.5	33	9.9	69	5.1

A survey of the locker plants in Ohio* showed about 260,000 lockers for late 1949. The 11 percent figure for families renting lockers would indicate the sample was representative of the entire state of Ohio.

Locker renters or home unit owners were classed as special occasion users of frozen food if they used their facilities only seasonally and did not use commercially frozen foods regularly during the remainder of the year.

Of the regular users of frozen foods 27.9 percent had lockers rented, while only 8.6 percent of the special users had lockers. This fact is significant and places great importance on the retail store as the principal source of frozen foods since more than three-fourths of the families using them depend upon stores for their supply. Of those renting lockers, 22.2 percent classed themselves as special occasion users of frozen foods.

It was found that 14.4 percent of the regular users had home units and only 2.2 percent of the special occasion users. This again

*The results of this survey were included in a study of use of home units published by the Ohio Agricultural Experiment Station as Research Bulletin 704, Feb. 1951—"Home Freezer Storage Units in Rural Areas."

shows that the majority of the users of frozen food depend entirely upon stores for their source. Of those who own home units 87.7 percent were regular users.

It was found that although families have lockers or home units there was no indication that they had used frozen foods any longer than those not having them. The average length of time for both groups was practically the same.

Only 11.9 percent of the locker renters and home unit owners buy commercially frozen foods for storage. In the urban areas, 25.6 percent of the locker renters and home unit owners purchased commercially frozen foods for storage, while only a very small percentage of the rural families using these facilities store food from retail sources.

Source of Food Stored in Lockers

The principal source of foods stored in lockers is from home production. This is to be expected since 64 percent of the lockers are in the rural areas. The percent of locker renters storing different home-produced foods is given in Table 13.

TABLE 13.—Percent of Urban and Rural Locker Renters Storing Different Kinds of Home Produced Foods in Rented Lockers.

Kinds of food	Urban	Rural	Total
Fruit	24.1	39.6	34.0
Vegetables	31.5	63.5	52.0
Poultry	14.8	44.8	34.0
Meat	25.9	60.4	48.0
Fish	3.7	4.2	4.0

Some locker renters do not have home produced foods and depend upon buying fresh food to store. Some locker renters have a home supply of food, but still need to buy other foods to fulfill their needs for storage. Many rural families reported high storage of foods because their home produced supply is seasonal in nature, while the city families depending primarily on retail purchases have available supplies during the entire year. The percent of those locker renters purchasing fresh foods for storage in their lockers is shown in Table 14.

TABLE 14.—Percent of Urban and Rural Locker Renters Purchasing Different Kinds of Fresh Foods for Storage in Rented Lockers.

Kinds of food	Urban	Rural	Total
Fruit	31.5	38.5	36.0
Vegetables	25.9	7.3	14.0
Poultry	25.9	16.7	20.0
Meat	51.9	40.6	44.7
Fish	11.9	1.0	4.7

Commercially frozen foods do not constitute a very large part of the total amount stored in lockers. Some of the locker renters in the urban areas purchase certain frozen foods for storage when they are able to buy them on special sales or if there is a particular commodity they like. Unless they do this, the locker offers no more convenience than the retail outlet to store commercially frozen foods. The percent of the locker renters purchasing these foods for storage is given in Table 15.

TABLE 15.—Percent of Urban and Rural Locker Renters Purchasing Different Kinds of Frozen Foods at Retail for Storage in Rented Lockers.

Kinds of food	Urban	Rural	Total
Fruits	13.0	0	4.7
Vegetables	13.0	2.1	6.0
Poultry	5.6	0	2.0
Meat	13.0	0	4.7
Fish	5.6	0	2.0

Source of Food Stored in Home Units

Since more than half of the home units were in the urban areas, some difference is expected in the source of foods stored in home units compared to the source for locker storage. The percent of the home unit owners using different home-produced foods for storage in home units is given in Table 16 and those purchasing frozen foods for that use in Table 17.

TABLE 16.—Percent of Urban and Rural Home Unit Owners Storing Different Kinds of Home Produced Foods in Their Home Units.

Kinds of food	Urban	Rural	Total
Fruits	27.8	54.5	40.6
Vegetables	36.1	72.7	53.6
Poultry	13.9	48.5	30.4
Meat	16.7	63.6	39.1
Fish	8.3	6.1	7.2

TABLE 17.—Percent of Urban and Rural Home Unit Owners Purchasing Different Kinds of Fresh Foods for Storage in Their Home Units.

Kinds of food	Urban	Rural	Total
Fruits	27.8	48.5	37.7
Vegetables	25.0	15.1	20.3
Poultry	16.7	18.2	17.4
Meat	30.6	42.4	36.2
Fish	8.3	12.1	10.1

Home unit owners have opportunity to take advantage of bargains offered in commercially frozen foods and the extra convenience of having them available in their home when they want them. This is especially true for owners in urban areas where most of the food stored is purchased from outside sources. Table 18 shows the percent of home unit owners storing commercially frozen foods.

TABLE 18.—Percent of Urban and Rural Home Unit Owners Purchasing Different Kinds of Frozen Foods at Retail for Storage in Their Home Units.

Kinds of food	Urban	Rural	Total
Fruits	25.0	0	13.0
Vegetables	33.3	3.0	18.8
Poultry	5.6	0	2.9
Meat	13.9	0	7.2
Fish	16.7	0	8.7

Seasonal Use of Frozen Food

Use of frozen foods by locker renters and home unit owners is limited by seasonal factors. Often the lockers or home units are empty at certain times of the year. Because vegetables and fruits are seasonal in local production. One would expect to find more food in the units just following the harvest season. However, if users of the lockers and home units store meat which is available during all months of the year, this seasonality will level out.

The home unit owners and locker renters were asked to designate the month of the year their locker or home unit had the most food in it and also the month during which it had the least.

During the month of September, 17.0 percent and for October, 25.7 percent of the lockers and home units were most nearly full. This period follows the harvest season for most fruits and vegetables. In February 10.8 percent said their locker or home unit was most nearly full which follows the months when butchering is at its peak.

During May, June, and July, families indicated their lockers and home units contained the least food. This is primarily due to the lack of available food products to store during the spring and early summer months and intentional emptying of lockers or units in preparation for fruits and vegetables from the new crop. Just how much this affects total consumption of frozen foods by these families was not determined.

CONSUMER OPINIONS CONCERNING FROZEN FOOD

Quality of Frozen Foods Purchased from Stores

Families were asked to rate the quality of frozen foods purchased as good, medium, poor, and variable. Very little difference was noted in the rating by rural and urban families, but some variation was noted when ratings were tabulated on the basis of family income. The percent of the families rating frozen foods in different quality groups by family income is shown in Table 19.

TABLE 19.—Percent of Families, by Income, Rating Frozen Food Purchased at Retail in Different Quality Classifications.

Ratings	Income Classification					All Groups
	1	2	3	4	5	
	Lowest	Group to			Highest	
Good	85.9	92.8	91.4	87.7	79.8	89.1
Medium	9.4	2.4	0.5	1.9	2.9	2.4
Poor	—	—	0.5	2.8	3.8	1.1
Variable	4.7	4.8	7.6	7.6	13.5	7.4
Total	100.0	100.0	100.0	100.0	100.0	100.0

The tendency for the higher income families to be more discerning is indicated by the difference in ratings. The greater percentage of Group 5 rating the frozen foods as variable in quality may be partly because of the greater amount and variety which they use. It will be noted that only a little more than one percent rated the products as poor. The high percentage rating the frozen food purchased at retail as good indicates that poor quality was not a great factor in limiting its use.

There was a difference between the ratings of frozen food purchased at retail by locker and home unit users. None of these families gave the ratings of medium or poor, but the percentage of good and variable ratings were different. The percentages are given in Table 20.

TABLE 20.—Percent of Locker Renters and Home Unit Owners Who Rated Frozen Foods Purchased at Retail, as of Good or Variable Quality.

Rating	Locker Renters	Home Unit Owners
Good	91.9	84.6
Variable	8.1	15.4
Total	100.0	100.0

Care of foods between the time they leave the store and when placed in the home unit may affect quality and be partly responsible for this difference in rating, because locker renters are more likely to use the food immediately than to store it awhile before using.

Consumer Reaction to Poor Quality of Frozen Food from Retail Sources.

No method of processing food is free from some occurrences of poor quality. Since frozen foods are relatively new to most consumers, their reaction to poor quality in frozen foods may be somewhat different than inferior quality in other forms.

Only 129 of the 800 families included in this study who used frozen foods had purchased any one item at retail which they considered poor. Their reactions to the poor quality with number and percent of families expressing each are listed in Table 21.

TABLE 21.—Number of Families Stating Certain Reactions to Frozen Food Purchased at Retail Which They Considered to be of Poor Quality.

Reaction	Number of Families
Wouldn't buy any more	44
Exchanged it	7
Exchanged it for different brand	15
Returned—got money back	10
Blamed processor	4
Stopped buying frozen food a short time	7
More care in choosing brands next time	4
Omit buying that particular commodity	23
No effect	4
Told grocer	5
Miscellaneous	6
Total	129

The most serious aspect of poor quality is brought out in the two reactions of those who said they wouldn't buy any more frozen foods and of those who said they would not buy any more of that particular commodity. These two groups constituted only 67 families out of 800 using frozen foods but the total use of frozen foods from retail sources could suffer considerably as a result.

Best Buy—Frozen vs. Canned or Fresh

Each family was asked in which form of fruits and vegetables they thought they got the most for their money—frozen, fresh, or canned. The real answer would be in the quantities which they purchased, because in all instances value received or expected determines the final choice of a purchase. The answers obtained probably came closer to measuring what they liked best, rather than the best value. In many instances, families were using certain frozen products practically to the exclusion of fresh and canned and their answers were likely based on their use of these certain fruits or vegetables.

The percentages in Table 22 should be used primarily as a measure of what the families thought of the different forms of fruits and vegetables.

TABLE 22.—Percent of Families in Different Income Groups Indicating in Which of the Three Forms They Thought Fruits or Vegetables were to be Preferred.

Commodity Form	Income Classification					All Groups
	1 Lowest	2	3 Group to	4	5 Highest	
Fruit						
Fresh	35.4	34.9	32.4	29.2	48.3	35.2
Frozen	43.8	40.4	50.6	48.9	36.8	44.5
Canned	20.8	24.7	17.0	21.9	14.9	20.3
Total	100.0	100.0	100.0	100.0	100.0	100.0
Vegetables						
Fresh	34.0	29.8	29.1	25.3	42.7	31.0
Frozen	46.0	48.1	54.8	55.5	44.9	50.6
Canned	20.0	22.1	16.1	19.2	12.4	18.4
Total	100.0	100.0	100.0	100.0	100.0	100.0

Further analysis or comment concerning these figures is felt unnecessary since the following analysis of premium prices which families said they were willing to pay will give more reliable data concerning value of frozen foods.

Home unit owners were more impressed with the value of frozen fruits and vegetables than locker renters. It is probable that this high regard for frozen foods was the reason for many families purchasing home units instead of ownership of the units influencing their estimation of the value of such food.

Almost exactly half, 50.3 percent, of the families thought a premium was justified for frozen foods over fresh foods, while 75.5 percent thought they justified a premium over canned.

Of the families indicating they believed frozen foods were worth a premium over fresh, 94.4 percent also thought frozen foods were worth a premium over canned. Of the families indicating that frozen foods were not worth a premium over fresh foods, 59 percent believed that a premium over canned foods was justified. Of the 683 families stating an opinion relative to whether or not a premium was justified, 20.6 percent thought no premium was justified over either canned or fresh foods.

Amount of Premium Which Families were Willing to Pay for Frozen Foods

Since 50.3 percent of the families using frozen foods thought they were worth a premium over fresh foods and 75.7 percent thought they were worth a premium over canned foods, these families were asked what percent premium they were willing to pay for the frozen foods. This figure varied from 5 percent to 150 percent. In the following discussion, fresh and canned fruits and vegetables will be taken up separately.

Frozen Over Fresh Fruit

On the average buyers thought frozen fruits worth a premium of 21.4 percent over fresh fruits. The percentage of premium families were willing to pay for frozen fruits bore little relation to their income. However, there was a significant difference between rural and urban families concerning premiums as shown in Table 23.

TABLE 23.—Percentage of Urban and Rural Families Stating Certain Percentage Premiums Which They were Willing to Pay for Frozen over Fresh Fruits.

Percent Premium	Urban	Rural	Total
20% or less	61.4	40.7	56.7
20.1—40%	27.2	39.0	29.9
40.1—60%	10.9	20.3	13.0
Over 60%	0.5	0.0	0.4
Total	100.0	100.0	100.0

Families in cities indicated less willingness to pay higher premiums than did rural families. The average percent premium indicated by the urban families was 20.1 percent, while the rural families indicated a 25.9 percent premium. It must be remembered that this

average premium stated by these families represents only one-half of the families using frozen foods since 49.7 percent of the families indicated that they were not worth a premium over fresh.

Frozen Over Canned Fruit

Again the income level of families apparently had little influence on the amount of premium which they were willing to pay. The percent of rural and urban families who stated their willingness to pay various premiums for frozen fruits over canned fruits is shown in Table 24.

TABLE 24.—Percent of Urban and Rural Families Stating Certain Percentage Premiums Which They were Willing to Pay for Frozen over Canned Fruits.

Percent Premium	Urban	Rural	Total
20% or less	59.1	37.5	54.0
20.1 - 40%	24.6	36.5	27.4
40.1 - 60%	14.4	25.0	16.9
Over 60%	1.9	1.0	1.7
Total	100.0	100.0	100.0

Average premium families were willing to pay was 23.3 percent for frozen fruits. For rural families the premium was 28 percent, with urban families indicating 21.9 percent.

This premium is substantial but falls short of the actual premium charged for frozen fruits over canned fruits. In a recent study on the price relationship of frozen, fresh, and canned foods it was found that frozen foods average about 50 percent more per pound than canned foods.¹

When all families interviewed who used frozen foods were included, less than 10 percent stated willingness to pay premiums as high as actually exist between frozen and canned foods.

Frozen Over Fresh Vegetables

The percent of rural and city families stating various premiums which they would pay for frozen vegetables over fresh is shown in Table 25.

¹ R. W. Sherman, W. L. Lenox, and Wilbur A. Gould: "Price and Quality Comparison of Selected Frozen, Fresh, and Canned Fruits and Vegetables", Ohio Agricultural Experiment Station, Bulletin 688, July 1949.

TABLE 25.—Percent of Urban and Rural Families Stating Certain Percentage Premiums Which They were Willing to Pay for Frozen over Fresh Vegetables.

Percent Premium	Urban	Rural	Total
20% or less	56.9	38.7	53.0
20.1—40%	28.9	40.3	31.3
40.1—60%	13.3	21.0	15.0
Over 60%	0.9	0.0	0.7
Total	100.0	100.0	100.0

Buyers indicated a willingness to pay an average of 22.7 percent premium for frozen over fresh vegetables. Rural areas specified 26.5 percent; city families indicated a 21.7 percent.

Frozen Over Canned Vegetables

Income had practically no effect upon the amount of premium the families were willing to pay. Acceptable premiums for frozen over canned vegetables is given in Table 26.

TABLE 26.—Percent of Urban and Rural Families Stating Certain Percentage Premiums Which They were Willing to Pay for Frozen over Canned Vegetables.

Percent Premium	Urban	Rural	Total
20% or less	54.2	31.9	48.7
20.1—40%	26.6	44.2	30.9
40.1—60%	16.3	23.9	18.2
Over 60%	2.9	0.0	2.2
Total	100.0	100.0	100.0

The average stated by the 75.7 percent who believed a premium was justified for frozen over canned vegetables was 28.4 percent in rural areas and 23.7 for urban users. This was higher than that justified over other forms, but still not as high as actual premiums received for these frozen foods over canned as shown in a previous study.¹

Consumers' Ratings of Individual Frozen Foods

All families using frozen foods were asked to state, in order of preference, five most satisfactory fruits, five vegetables, and five meats. This was done separately for the three sources of frozen foods; from lockers, home units and retail purchases.

¹ Ibid.

In summarizing these preferences, only the eleven items mentioned most frequently from each source were included. As shown previously, these eleven commodities purchased at retail comprised 78.1 percent of the total purchases. It is fairly safe to assume that this percentage would also apply to frozen food used from lockers and home units.

The eleven commodities leading in preference from each source are listed in Table 27.

TABLE 27.—Eleven Food Items Leading in Preference from Each of Three Different Sources as Determined from Those Families Using Frozen Foods.

From lockers	From home units	From retail purchases
Beef	Beef	Peas
Pork	Pork	Corn
Poultry	Poultry	Limas
Corn	Corn	Broccoli
Strawberries	Strawberries	Spinach
Peaches	Peaches	Cauliflower
Peas	Peas	Green Beans
Green Beans	Green Beans	Brussel Sprouts
Limas	Limas	Peaches
Cherries	Cherries	Strawberries
Raspberries	Raspberries	Fish

No attempt is made to place these commodities in the order of their preference in this listing. This order would require a weighting of the different choices and such a weighting was not attempted. Details of these choices are shown in the tables which follow. It will be noticed that the same 11 commodities appear for locker and home unit sources.

Since many of the families used a limited number of commercially frozen products, it was not possible for them to make five complete ratings for fruits, vegetables or meats. This was particularly true of the low income groups where a more limited use of frozen foods occurred. For this reason the number of families represented decreases from first toward fifth choices.

The number of families rating the fruits leading in preference, from the three sources as first, second, third, fourth or fifth choice is shown in Table 28.

TABLE 28.—Number of Families Rating Most Preferred Fruits in Each of Five Positions from Different Sources.

Fruit	Preference Rating					Total
	1st	2nd	3rd	4th	5th	
Purchased at retail						
Strawberries	315	37	6	1	0	359
Peaches	55	61	12	2	0	130
Used from locker storage						
Strawberries	45	9	4	0	0	58
Peaches	17	17	6	5	0	45
Cherries	8	10	8	3	1	30
Raspberries	5	13	8	1	0	27
Used from home unit storage						
Strawberries	26	11	2	1	0	40
Peaches	6	12	4	2	1	25
Cherries	9	3	3	2	1	18
Raspberries	4	4	5	2	1	16

Raspberries and cherries were among the 11 most popular items from lockers and home units, but not from retail purchases. These two items were stored largely from home production, but were still not as popular as strawberries and peaches from the same sources. Strawberries are by far the most popular frozen fruit from all sources and rated first more often than all other fruits combined. Peaches were also popular and were placed in first or second choice more often than any other fruit except strawberries.

The number of families rating the vegetables leading in preference, from the three sources as first, second, third, fourth, and fifth choice is shown in Table 29.

TABLE 29.—Number of Families Rating Most Preferred Vegetables in Each of Five Positions from Different Sources.

Vegetable	Preference Rating					Total
	1st	2nd	3rd	4th	5th	
Purchased at retail						
Peas	238	101	30	9	3	381
Limas	110	86	30	12	5	243
Corn	62	72	36	10	3	183
Broccoli	23	24	24	6	4	81
Green Beans	14	28	19	4	—	65
Cauliflower	21	19	11	8	4	63
Spinach	20	15	13	10	2	60
Brussel Sprouts	11	21	10	10	3	55
Used from locker storage						
Corn	38	15	7	—	—	60
Peas	14	21	8	2	—	45
Green Beans	11	10	8	1	2	32
Limas	5	14	8	3	—	30
Used from home unit storage						
Corn	17	6	9	1	1	34
Peas	16	10	3	2	—	31
Limas	6	14	4	3	—	27
Green Beans	5	8	8	3	—	24

The source of the product had more effect on preference ratings for vegetables than for fruits. Peas were by far the most popular from retail purchases, but corn was most popular from locker and home unit storage. Information accounting for the difference in popularity of foods from the different sources was not obtained.

The number of families rating the meats leading in preference, from the three sources as first, second, third, fourth, and fifth choice is shown in Table 30.

TABLE 30.—Number of Families Rating Most Preferred Meats in Each of Five Positions.

Meat	Preference Rating					Total
	1st	2nd	3rd	4th	5th	
Purchased at retail						
Fish	78	9	5	0	1	93
Used from locker storage						
Beef	105	8	1	1	0	115
Pork	8	54	10	1	—	73
Poultry	8	27	29	2	1	67
Used from home unit storage						
Beef	29	6	1	0	0	36
Pork	5	14	4	3	0	26
Poultry	7	8	11	0	0	26

Fish was the only meat purchased at retail in frozen form which was included among the 11 most preferred items. The popularity of beef from locker and home unit storage is well demonstrated by the figures above. From both of these sources it was the most popular first choice.

Meat constitutes an average of about 75 percent of products stored in lockers and home units and largely takes the place of meat bought at retail or stored as cured meat. The heavy use of meat from such storage makes the users of lockers and home units much heavier users of frozen foods than for those purchasing at retail only. Thus, the choices of families using these facilities represent a considerably different group of families with reference to total frozen food use as well as a difference in kinds of such food used.

As an added point of interest to the reader the percent of the families using frozen food from the three sources who mentioned

each of the 11 leading items in any one of the five choices will be included here. These percentages are given in Table 31.

TABLE 31.—Percent of Families Rating Individual Frozen Foods as One of the Five Best from the Source from Which They Obtained Them.

Food Item	Users of Commercially frozen foods (633 families)	Users of frozen food from lockers (127 families)	Users of frozen food from home units (48 families)
Peas	60.2	35.4	64.6
Corn	28.9	47.2	70.8
Limas	38.4	23.6	56.3
Broccoli	12.8	—	—
Spinach	9.5	—	—
Cauliflower	10.0	—	—
Green beans	10.3	25.2	50.0
Brussels sprouts	8.7	—	—
Peaches	20.5	35.4	52.1
Strawberries	56.7	45.7	83.3
Fish	14.7	—	—
Beef	—	90.6	75.0
Pork	—	57.8	54.2
Poultry	—	52.8	54.2
Raspberries	—	21.3	33.3
Cherries	—	23.6	37.5

This list which includes the 11 most popular items from each of the three sources is treated separately for each source here, as in the previous three tabulations. As an example, to better understand the meaning of each figure, the 60.2 percent for peas purchased at retail means that that percent of the 633 families using food from that source reported peas as one of their first five choices. The remainder of the 633 families either did not use peas or did not select peas as one of the most preferred items. The blanks in this tabulation mean that this item was not one of the 11 most popular from that particular source.

Consumer Opinions of Retail Merchandising of Frozen Foods.

Of Store Display

In order to determine the effect the type of display cabinet and location of the cabinet in the store has upon consumer buying habits, the families were asked whether they would purchase more frozen foods if the store display was better and the cabinet was placed in a more convenient location. Of those families answering this question, 39.6 percent said they would buy more. This points out

the importance of better merchandising through the retail store if increased sale of frozen food is desired.

Of Size of Package

Some frozen foods are packaged in one pound units, although most are in smaller packages. Size of package was not given as a limiting factor to frozen food use, therefore, it could not be an important factor in limiting frozen food sales. However, 13.7 percent of the families using frozen foods indicated that the present package size did not completely meet their needs. Of this 13.7 percent, one-half wanted the package larger, one-third wanted two package sizes, and the rest wanted the package smaller. Half of the families wanting the package larger indicated a 50 percent increase and the other half said package should be twice as large.

Since 86.3 percent of the families indicated that the size of the package was satisfactory, there is apparently little reason for the processors to change the package size. Any one change mentioned here would affect the consumption habits of such a small number of families that it might not be desirable or profitable to make a change except that adding both a smaller and larger package might increase total sales.

Of Ways to Improve Merchandising

The families suggesting improvements in retailing frozen foods made a variety of suggestions, but the most important was better display by the retail store. The need for such an improvement was mentioned by 45.2 percent of the families. This included kind of cabinet, location of cabinet, method of displaying in case, posting prices, and all other factors which may contribute to better presentation of frozen food. Lower prices were mentioned by 18 percent of the families offering suggestions for improvement, 13.6 percent suggested more advertising, 10.1 percent suggested a larger variety of frozen foods, 5.2 percent suggested that more stores handle them, and 7.9 percent gave miscellaneous suggestions.

Many families thought that if the stores offered a display whereby the customer would not be required to "dig out" the commodity they wanted and if advertising was informative so as to acquaint the consumers with the merits of frozen foods, sufficient volume could be attained to enable the processor to lower the price substantially.

Consumer Brand Preference

The families were asked to indicate their brand preference of frozen foods purchased at the retail stores. The families indicated

18 different brand names as their preference, but 39.2 percent of the families said they had no choice.

When asked why they chose a particular brand of frozen food, 38.1 percent said that it was because of quality. Reliability was given by 13.8 percent and another 13.8 percent said they hadn't tried any other brand. Other reasons why they chose a certain brand were that it was widely advertised, satisfied with it, readily available, only brand available, and best ever tried.

FACTORS LIMITING PURCHASES OF FROZEN FOODS

Up to this point we have considered factors that affected the purchase of frozen foods by those families using it during the last year or longer. In order to find what factors were most responsible for limiting frozen food purchases, all 1368 families were questioned as to why they did not buy frozen foods or why those who bought frozen foods did not buy more. The importance of the factors differed to some extent, between places of residence and between income groups which the various families represent.

The percent of families naming various factors limiting the use of frozen foods by income group, and by residence is given in Table 32.

Although there is a similarity between some of the limiting factors given above, they were kept separate rather than to merge the meanings. The importance of analysis by income groups can readily be seen in the difference in several cases. This is well illustrated by the differences in percentages of families in the different income groups who do their own canning and therefore have less need of frozen or for that matter commercially canned, products. In general, the comparative percentages of the five income groups are in line with what might be expected for the different limiting factors. However, it was rather surprising to learn that a higher percent of the lower income groups did not like frozen foods than for the other groups. Also, that fresh or canned foods are preferred by more families in the higher income brackets than in the lower brackets.

Comparing the families living in the urban areas with those in rural areas also brought out some rather startling facts. First, there were many more of the urban families who thought frozen foods were too expensive than was true for the rural families. The much higher percentage of urban families who preferred fresh foods no doubt was due to the better availability of good fresh produce

in urban markets at most times of the year. Another point of considerable difference which is difficult to explain is the fact that about three times as high a percentage of urban families as of rural families said they didn't like frozen foods. The lack of availability of frozen foods at retail in rural areas was offset by the high percentage who stored their own food. As a result, there was not too much difference between the two groups in the effect of availability on use of frozen foods.

This group of limiting factors could well furnish a guide to the frozen food trade wherein improvement or changes might be made to increase acceptance of frozen foods.

FROZEN FOODS AS A SUBSTITUTE FOR CANNED OR FRESH FOODS

Of the families using frozen foods, 74.5 percent indicated that they purchased frozen foods as a substitute for canned or fresh items of the same commodity. In other words, these families would have used either fresh or canned items of the same commodity if the frozen form had not been available.

The percent of families using frozen foods who indicated this substitution of frozen foods for the canned or fresh form of the same commodity by income groups and family location is shown in Table 33.

TABLE 33.—Percent of Families that Said They Substituted Frozen for Fresh or Canned Items of the Same Commodity by Income and Place of Residence.

Substitute for canned or fresh	Income Classification					Residence		
	1 Lowest	2	Group 3 to	4	5 Highest	Urban	Rural	Total
Do substitute	57.4	75.0	77.7	80.2	71.4	17.9	85.0	74.5
Do not substitute	42.6	25.0	22.3	19.8	28.6	28.1	15.0	25.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Those families in the lowest income group do not substitute frozen foods as readily as do the families in the other income groups. Since the families in income Group 5 show more preference for fresh items (as was shown earlier in this study) substitution of frozen commodities for fresh or canned is comparatively low in the group also. The rural families purchased frozen foods as a substitute for

canned or fresh food more readily than did the city families. This partially is due to the lack of availability of fresh items in the rural stores.

ADVANTAGES OF OBTAINING FROZEN FOODS FROM DIFFERENT SOURCES

From Stores at Retail

Families were asked to state the advantages of buying frozen foods at the store compared to storing food in a locker or a home unit. The advantage given most often was "convenience", 40.4 percent of the families listing it. The percent of families stating various advantages for purchasing from the store is given in Table 34.

TABLE 34.—Percent of Families Giving Stated Advantages of Obtaining Frozen Foods from Retail Sources Rather than Storing in Lockers or Home Units.

Advantage	Urban Families	Rural Families	Total
No investment	15.9	23.7	18.2
Convenient	48.1	21.2	40.4
Better processing	0.7	2.5	1.2
Variety	6.8	10.2	7.7
Better quality	1.0	0.9	1.0
Economical	16.3	22.9	18.2
No preparation	11.2	18.6	13.3
Total	100.0	100.0	100.0

The advantage of "convenience" was stated more often by those living in the urban areas than those in the rural areas, probably because of proximity of stores to buyers and also because a larger percentage of the stores in the urban areas sold frozen foods than did the rural area stores. Apparently the investment necessary to buy a home unit was important in rural areas in limiting such storage, as is indicated by the high percentage mentioning that feature. It was surprising to learn that a higher percentage of rural than urban families mentioned economy as an advantage of purchasing from the store.

"Economy" was listed by a larger percentage of families in the low income groups than by those in the high income groups. "No preparation" was stated more often in the higher income groups

than in the low income groups as an advantage of frozen foods purchased at stores.

The ability to obtain variety was much more important in the minds of the purchasers of frozen foods than was its quality compared to that from lockers or home units.

From Lockers

Economy was stressed more often as an advantage of storing in lockers than for purchase at retail. Convenience, which seemed most important to the purchasers of frozen food at stores, was fourth in importance as one of the advantages of locker storage. The percent of the families stating various advantages for locker storage is given in Table 35.

TABLE 35.—Percent of Families Giving Stated Advantages of Storing Food in Lockers Compared to Storing in Home Units or Purchasing it at Retail.

Advantage	Urban Families	Rural Families	Total
Economical	52.2	27.3	38.0
Store own produce	18.5	16.5	17.4
Small investment	6.5	25.6	17.4
Convenient	16.3	17.4	16.9
Meat supply during scarcity	4.3	0.8	2.3
Processing service	2.2	12.4	8.0
Total	100.0	100.0	100.0

The urban families stressed economy more often than did those in the rural areas, but the families in the rural areas listed "small investment" more often. There was no mention of "quality" as an advantage of storing food in a locker. This was surprising for many rural families have stressed quality of their own products. The advantage of a "meat supply during scarcity" which was given by 2.3 percent of the families, was probably a carry over of the advantage of lockers during the war when rationing was in effect.

There was little relation between income of the families and the advantages stated, with the exception of use of processing services of locker plants. Most of the families listing this as an advantage were in the upper income groups, with 14.3 percent of the highest income group listing it.

From Home Units

The percent of families giving the various advantages for storing in home units from urban and rural areas is shown in Table 36.

TABLE 36.—Percent of Families Giving Stated Advantages of Storing Food in Home Units Compared to Storing in Lockers or Purchasing it at Retail.

Advantage	Urban Families	Rural Families	Total
No travel	3.8	16.2	6.8
Convenient	57.0	60.8	57.9
Economical	23.8	17.6	22.3
Time saving	4.3	4.0	4.2
Better quality	0.9	1.4	1.0
No storage problem	3.4	—	2.6
Large supply	6.8	—	5.2
Total	100.0	100.0	100.0

Convenience and economy are the advantage of home units which strike the fancy of most families. To the rural people the fact that they don't have to make so many trips to town if they have a home unit was important. However, this advantage could well have been listed as "convenience". Income was found to have little relation to advantages given.

AVAILABILITY OF COMMERCIALLY FROZEN FOOD

The fact that frozen foods were offered for sale in only 45.5 percent of the retail grocery stores is a factor contributing to some of the variation in use of frozen foods. All stores were included in this analysis even though a family visited as many as five or six stores.

Just 70 percent of the store visits by all families interviewed were at stores offering frozen foods for sale. In the urban areas this percentage was 77.5 percent, while in the rural areas it was only 53.4 percent. Only one family in 16 shopped at no store where frozen food was handled.

Some difference was indicated when the division was made in income groups. Approximately 18 percent more of the store visits by families of the highest income group were to stores offering frozen foods for sale than for the average of the other four groups.

Fourteen and eight-tenths percent of the families go to stores selling frozen foods rather than other stores because of the availability of frozen foods. Of the families in Group 1, 9.6 percent were influenced to go to certain stores because of availability of frozen foods, while in Group 5 the percentage was 19.2. With the regular users of frozen foods, 26.2 percent made their store visits on this basis, while 15 percent of those who used frozen foods only on special occasions stated this reason for going to certain stores. In the urban areas 30 percent of the regular users indicated preference for stores selling frozen foods, but for the special occasion users in the urban areas the percentage was only 13.6. There was little difference between regular and special occasion users in the rural areas as to their preference in trading at stores because of availability of frozen foods.

EXPECTED USE OF FROZEN FOODS AND FACILITIES DURING THE NEXT YEAR

From Retail Sources

Since the majority of families use the retail store for their source of frozen foods the plans for future purchases at retail stores will influence the frozen food use to a great degree. In order to determine the expected future use the families were asked whether they expected during the next 12 months to buy more, less, or the same amount of frozen foods at the retail store. There was little relation between incomes of families and their future plans for use of frozen foods. The percent of families who indicated whether they expected to buy more, less, or the same amount of frozen foods at the retail store during the next 12 months is shown in Table 37 by place of residence.

TABLE 37.—Percent of Families Stating Different Intentions Concerning Amount of Frozen Food They would Use in the Future Compared to Amount Used at Time They were Interviewed.

Expected future frozen food use	Urban Families	Rural Families	Total
More	20.8	33.3	23.1
Less	5.5	6.3	5.7
Same amount	73.7	60.4	71.2
Total	100.0	100.0	100.0

Unless the 23.1 percent of the families who expect to increase their purchases do so by a large amount, the total increase will probably be fairly small. However, such answers are based on knowledge of frozen foods at the present time and any change in price relationships between frozen and other forms, or better techniques in preservation in any form, could greatly alter their views. Rural folks not only are at present much heavier users of frozen foods, but also expect to increase their purchases from retail sources in the future to a greater extent than urban folks.

From Locker and Home Units

Of the 1218 families not having a locker only 1.6 percent or 19 families expected to rent one during the next 12 months, while two families of the 150 now renting lockers expected to give up the one they are now renting. This is an expected increase of 17 lockers for the total of 1368 families included in this study.

Of the 1299 families not owning a home unit, 43 expect to buy one within the next 12 months, while seven of the 69 now owning home units expect to dispose of the unit now in use. This is an expected increase of 36 home units for the total 1368 families in this study.

The expected storage of food in lockers and home units follows the same pattern as was set forth for purchases from the store. However, many of the home units and lockers are now used to capacity and additional storage of food in these cases would require added facilities. Since over one-fourth of the locker renters and home unit owners indicated they would store more food, we can expect an increase in consumption of frozen foods from these sources and incidentally, the purchase or renting of more storage space by some families.

Section II—RETAIL MERCHANDISING OF FROZEN FOODS

Three hundred thirty retail stores within or adjacent to areas where consumers were contacted were visited in order to get a picture of the offerings of frozen foods at retail. One hundred fifty or 45.5 percent of these stores sold frozen foods.

Of the 257 stores in urban areas, 125 or 48.6 percent sell frozen foods, while of the 73 in rural areas, 25 stores or 34.2 percent sell frozen foods. This indicates a greater availability of frozen foods in the urban areas than in the rural areas, both in percentage of stores handling them and in proximity of stores to consumers.

The year retail stores introduced frozen foods varies from 1934 for a few stores to those stores who had just introduced it at the time of this study. Of the stores visited 27.4 percent had introduced frozen foods prior to World War II. A few started sale during the war, but almost one-half of them introduced frozen foods after World War II.

RETAIL STORE DISPLAY UNITS AND THEIR COST

Various methods of displaying and holding frozen foods have been used. Some stores use special cabinets designed for the purpose of displaying frozen foods, while others use ice cream cabinets, home units or even home constructed cabinets. Following is the percentage of stores by size of the original storage or display unit used:

Size (cubic feet)	Percent of stores
0 - 4.99	5.8
5 - 9.99	34.0
10 - 14.99	15.5
15 - 19.99	11.7
20 - 24.99	24.3
25 - 29.99	1.9
30 and over	6.8

From the data above it can be seen that 39.8 percent of the stores originally used units with storage area less than 10 cubic feet for frozen foods. Very few of these small units had been designed especially for frozen food display.

Some stores have the cabinets in use which were installed at the time they started selling frozen foods, but 79 percent of the cabinets now in use were purchased after World War II. Since approximately 50 percent started selling frozen foods before World War II it is evident that a large percentage of the original units have been replaced. Following is the percentage of stores by size of the present frozen food unit used:

Size (cubic feet)	Percent of stores
0 - 4.99	1.0
5 - 9.99	26.3
10 - 14.99	16.2
15 - 19.99	18.2
20 - 24.99	23.2
25 - 29.99	2.0
30 and over	13.1

Apparently many stores replaced their original small units with larger ones. At present only 27.3 percent of the stores use display units with less than 10 cubic feet, while a larger percentage have units 30 cubic feet and over.

The cost of the display units now in use ranged from a low of \$150 to a high of \$2,800. The average cost of all cabinets was \$841.58, which indicates the expense incurred when introducing frozen foods for sale. Repair averaging \$27.05 was required on 34.7 percent of the units. The remainder had had no repair since installation.

VARIETY OF FOODS FOR SALE AND CHANGE IN VOLUME OF LEADING ITEMS

There were 42 different frozen food commodities for sale by the stores in this study. Some articles were of little importance as far as volume was concerned. The number of stores handling the 11 leading frozen commodities and the number of stores showing any change in their sales of those commodities between the last two complete years before interview is shown in Table 38.

TABLE 38.—Number and Percentage of Stores Handling Each of the Eleven Leading Frozen Food Items, and Number Reporting a Change in Volume from Preceding Year from a Total of 330 Stores Visited.

Food Item	Stores Handling Each Item		Stores Reporting Increase Over Preceding Year	Stores Reporting Decrease From Preceding Year
	Number	Percent		
Peas	101	30.6	27	1
Limas	102	30.9	21	1
Strawberries	100	30.3	18	3
Corn	99	30.0	18	1
Broccoli	92	27.9	19	2
Peaches	95	28.8	9	4
Spinach	98	29.7	4	1
Green Beans	98	29.7	15	2
Fish	88	26.7	11	0
Cauliflower	95	28.8	16	2
Brussels Sprouts	94	28.5	16	2

Some stores had handled frozen foods for less than two complete years and were unable to give a measure of comparison. Of the stores reporting, the majority reported no change in volume of sales. The number of stores reporting decreases in volume of sales for

any of the above commodities was very small. Since most stores indicated no change in sales and a few showed some decrease, it is apparent that the increase in total amount of these 11 leading commodities was of a moderate amount. Ice cream was not included in this study, but in many stores it was handled in considerable volume as a very recent venture.

Most of the commodities mentioned were kept available at the stores at all times. However, 43.6 percent of the stores indicated that some of the items were not available at times due to infrequent delivery service of the frozen foods or to lack of sufficient storage space. Seventy and two tenths percent of the stores had weekly delivery and 12.8 percent, semi-weekly delivery. Delivery to other stores ranged from daily to monthly service. Most stores indicated no problem of delivery service for the most popular commodities as the demand could be estimated with a moderate degree of accuracy.

The number of wholesalers furnishing the stores with frozen foods varies with the store. Forty and two tenths percent of the stores are serviced by one wholesaler, 42.3 percent by two wholesalers, and the rest by three or more, with five wholesalers being the maximum for any one store.

STORE OWNERS' OR MANAGERS' OPINIONS OF FROZEN FOOD SALE

The retailers expressed optimism toward the future sales of frozen food since 82.6 percent said they believed sales would increase in their community. With this in mind, 72.0 percent said their facilities were adequate for handling frozen food, but 28 percent indicated their facilities were not adequate to handle the present or future needs of frozen food sales. Some of those not having adequate facilities expect to make changes to meet their needs. Ninety per cent of the stores plan to expand their frozen food sales in the future. Only 2 percent expected to decrease their sales and the rest expected to maintain their present level of sales.

The margins received on frozen food by the retailer averaged slightly higher than that for other food. In both cases margins were calculated on the same basis. For frozen foods the average margin was 22.19 percent, while for other foods the average was 19.27 percent.

In comparing the time spent in the store on frozen foods to other foods 71.4 percent of the retailers said frozen foods took less time, 13.5 percent indicated they took more time, and the remainder said there was no difference.

The losses incurred in handling frozen foods were very small as 86.2 percent of the retailers experienced no losses at all. The causes of most of the losses were display cabinet failure or stained or damaged packages. While the retailers indicated that they usually absorb the losses, some stated the losses either were partially or wholly absorbed by the wholesaler.

Of the retailers, 76.9 percent indicated that frozen foods were profitable, 20.2 percent said they were not, 2.2 percent were not sure and one retailer said they were not profitable in the winter.

RETAIL PRACTICES IN FROZEN FOOD SALE

The consumers indicated that poor store display was one of the limiting factors to their purchase of frozen foods. Almost one-half of the stores had their cabinet located in the back part of the store and some even had them located in a far "out-of-the-way" corner where the frozen foods were very inconvenient to the customer. However, many of the stores featured frozen foods because of the attractiveness of the display case. This sort of display induces impulse purchasing. It was noted that a better job of keeping the display in order accompanied the prominence given the frozen food cases.

Factors other than location of the cabinet are also important as was shown by the complaints made by the consumers. The display of prices of the commodities was given importance by the consumers, yet 31.2 percent of the stores did not post the prices of the commodities on the outside of the display case. Most retailers mark each package, but, in many instances, after it is held in the case a few hours the mark becomes covered with frost, making it difficult to read.

Informative advertising was another policy which met the favor of many consumers. Fifty-eight percent of the retail stores advertised their frozen foods in some way. Several mediums of advertising were used, but the local paper and window and store displays were the types used most. Some stores sent out leaflets, postcards, and handbills and one retailer used the radio. It will be noted, however, that 42 percent of the stores did no advertising.

Just how much the various factors will influence the consumption of frozen foods is not known. The stores indicated that the average sale of frozen food per customer was almost two packages.

STORE OWNERS' OR MANAGERS' SUGGESTIONS FOR IMPROVING FROZEN FOOD SALE

After being exposed to the difficulties and limitations in the sale of frozen foods, the retailer can offer some valuable information concerning methods of improving frozen food sale. The suggestion mentioned most often by them was improvement in the type of package used for the frozen food. Some thought it should be more colorful in order to attract more customers. The fact that some damage was caused because of the type of package, a few retailers thought the package should be water tight or water proof in order to prevent leakage. Others were in favor of a cellophane package or a package with an open front to make the product visible to the customer. A few suggested offering the commodities in two sizes of packages.

A better display cabinet was given as the next most important improvement which might be made. Retailers favored the modern type cabinet now available, but some raised a question as to who should stand the expense of the cabinet. Those who raised this question felt that the wholesaler should furnish the cabinet on a leasing arrangement or that the wholesaler should furnish the display cabinet and offer them regular service on the cabinet. Most retailers recognized the importance of a good display in merchandizing frozen foods.

The retailers indicated that educational advertising was badly needed in the sale of frozen foods. The consumers need more information on methods of preparation and use of the frozen foods. According to the retailers, many customers do not know how to care for frozen foods after they get them home. The retailers felt that through informative advertising concerning handling and using frozen foods, the number of complaints received on frozen foods could be greatly reduced. The cost of this service, the retailers suggested, should be carried by the wholesaler as they could do the advertising more advantageously.

Many retailers indicated that price was a limiting factor in some purchases (as was indicated by the consumers themselves) and therefore, wholesalers and processors should try to lower prices

nearer to competitive prices of fresh and canned commodities. They feel that this would greatly increase frozen food sales.

A few retailers were interested in a promotion of better quality in frozen foods. This was not a criticism of all brands, but many indicated that there was the presence of many brands which failed to meet high quality standards, thereby giving all frozen foods a bad name. These retailers suggested some method of quality standard, possibly similar to the grades used on some canned goods so that the consumer could shop with more confidence when purchasing frozen foods.

SUMMARY and CONCLUSIONS

Consumption of frozen fruits, vegetables, and meats increased steadily from its infant stage in the 1930's. As a result of this increasing importance of frozen foods this study of their acceptance and sale was undertaken. The study included a survey of the sale of commercially frozen food through retail stores.

Including meats, which made up about half the total frozen foods used, approximately 35 pounds of frozen foods per capita per year were used in Ohio. This makes up about two percent of the retail weight of all foods consumed. Only 60 percent of the families were using frozen foods at the time information was collected in 1949.

Indications are that frozen food consumption will increase somewhat, based on expressed intentions of families to use more from retail sources and from use of more home units. Locker use has apparently neared its maximum. The quality of frozen foods as expressed by consumers, rated very high and adds to the possibility of its expanded use.

The most important limiting factors to expanded use, as expressed by the consumers and storekeepers, are high prices and merchandising problems. The consumers are willing to pay an average of 20 to 25 percent premium for frozen over canned and fresh foods. This, however, is less than actually exists for most commercially frozen foods, and offers a challenge to the frozen food industry to lower the price, while maintaining quality. The merchandising difficulties, such as poor displays, bad packages, and lack of informative advertising will be easier to overcome.

The attitude of the consumers and storekeepers interviewed was that if these limiting factors could be overcome the consumption of commercially frozen foods would increase materially.

Rural families, through heavy use of locker facilities, have led urban families in use of frozen foods. However, they purchase considerably less from stores than city families. The possibilities of frozen meats sold commercially is indicated by the almost universal acceptance of these frozen products from lockers and home units.

Basing judgment on the expressed intention of 1,368 families interviewed, use of food from lockers will increase moderately and from home units by a considerable amount. While there were only 69 home units owned by the 1,368 families, 43 others expressed their desire to purchase one in the near future and seven expected to dispose of theirs. If this intent materialized, the number of home units would increase by 50 percent in a year or so from the time of interview.