

Home Freezer Storage Units In Rural Areas

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The storage of food in frozen form in locker plants and by commercial concerns in cold storage warehouses has been of increasing importance for over a decade. Home cold storage units have had their development largely since 1945. Experience with the latter has been rather meager and any reliable data on the use and satisfaction of such units have only recently become available. The purpose of this study was to determine some of the facts concerning their use.

The study was limited to rural areas, with most of the data taken from farmer unit owners. Information was obtained by personal interview with cold storage unit owners in areas selected by random sampling over the entire state. With a few exceptions, the interviews were limited to owners of standard type units who had at least a year of experience with its use.

Data concerning storage of food generally applied to the experience of the home unit owners during the year previous to the interview. Most of the data applies to 1948 or a fiscal year starting in 1948 and ending in 1949.

The most important source of frozen food to the rural people prior to the introduction of home units was from locker plants. For this reason a short history of locker plant numbers in Ohio is given here.

While a few concerns offered frozen food storage facilities prior to 1936, (Fairmont Creamery Company as early as 1918) the era of present day locker plants really started from this date. The most effective way to show its growth is by the number of plants and number of lockers opening each year.

Table 1. Number of Locker Plants Starting During Designated Years, Number of Lockers in New Plants or Added to Existing Plants and Total Number of Lockers in all Plants at End of Each Year.

Year	Number of Plants Starting	Lockers In New Plants Or Added to Existing Plants	Total Lockers For Use
1938 or earlier	26	10,922	10,922
1939	17	9,883	20,805
1940	20	7,107	27,912
1941	41	14,014	41,926
1942	36	17,039	58,965
1943	15	17,884	76,849
1944	50	29,584	106,433
1945	59	39,659	146,092
1946	86	51,821	197,913
1947	66	47,471	245,384
1948	30	15,169	260,553
Total	446		260,553

In addition to the plants shown here, there was one which operated temporarily during the war, but discontinued and was not included because reliable information was not available concerning it. Nineteen forty-nine saw the addition of 13 plants with 3,189 lockers.

Information Concerning Families Interviewed

Three hundred fifty-six unit owners were interviewed, of which 287 were farmers and 69 were rural non-farm residents. The size of family was obtained to determine its effect on the use of the units. The number of families of each size is shown in Table 2.

Table 2. Number of Farm and Rural Non-Farm Families, By Size of Family of 356 Home Unit Owners Interviewed.

Persons Per Family	No. of Farm Families	No. of Rural Non-Farm Families
1	2	
2	54	17
3	64	18
4	65	19
5	44	3
6	26	8
7	14	1
8	9	2
9	3	
10	3	
11	1	
No Information	2	
Total	287	69

The average size of the farm families was 4.13 and of the rural non-farm, 3.68 with an average of 4.04 for the entire group.

Relation of Income to Unit Ownership

Unit owners were divided into three groups on the basis of their estimated income. This empirical method of rating was not considered accurate enough to use for detailed analysis, but was used as an aid in determining to what extent units were being purchased at different economic levels. On the basis of their rating, 18 percent of the units were owned by families estimated to be in the lowest third income level, 30 percent by families who were estimated to be in the top 15 percent and the remaining 52 percent of the units were owned by the group in between. No further analysis was made of these data.

Relation of Family Size to Size of Units Owned

There was some relationship of the size of family and the size of home unit owned, but such relationship was not consistent. The average storage space per individual in the family decreased generally with the size of the family. One exceptionally large unit was owned by a large family and was principally responsible for the high average of 4.29 cubic feet per individual for families with over eight members. This unit had 130 cubic feet capacity. Another large unit of 190 cubic feet capacity was owned by a family of two people, but had less effect on the averages, because of the large

number of families in that group. Information concerning amount of space per individual was obtained from all but twelve families. These data are shown in Tables 3 and 4.

Table 3. Number of Families Classified by Storage Space Per Family Member for Families of Different Sizes and Average Storage Space Per Family.

Members Per Family	Storage Space Per Person (cubic feet)							Total Number of Families	Storage Space Per Family (cu. ft.)
	Less Than 2.00	2.00 to 2.99	3.00 to 3.99	4.00 to 4.99	5.00 to 5.99	6.00 to 6.99	7.00 or more		
1	—	—	—	—	—	—	2	2	10.00
2	1	6	8	13	7	8	25	68	14.48
3	2	15	19	9	16	11	8	80	14.37
4	12	23	17	17	4	4	6	83	14.20
5	8	8	14	3	3	9	—	45	17.60
6	11	8	6	3	4	—	1	33	17.16
7	6	4	1	1	2	—	1	15	23.45
8	7	2	2	—	—	—	—	11	14.40
Over 8	2	2	1	—	—	1	1	7	41.67
Total	49	68	68	46	36	33	44	344	15.69

The average storage space per member for the 344 families was 3.94 cubic feet. This is somewhat lower than is usually recommended. Only 113 of the families had as much as five cubic feet of storage space per individual. Fifty-nine families had less than two cubic feet of storage space per individual and of these families all but 15 had five or more members.

Table 4. Number of Farm and Rural Non-Farm Families of Different Size Owning Stated Sizes of Home Units.

Members Per Family	Under 6.00	Size of Units (cubic feet)						
		6.00 to 9.99	10.00 to 13.99	14.00 to 17.99	18.00 to 21.99	22.00 to 25.99	26.00 and over	
Farm Families								
1	—	1	1	—	—	—	—	—
2	4	16	11	14	3	1	2	—
3	1	11	18	19	8	1	4	—
4	—	12	15	16	10	6	5	—
5	—	8	8	10	3	3	11	—
6	—	7	2	6	4	3	4	—
7	2	—	4	3	1	—	4	—
8	1	1	2	1	2	—	2	—
Over 8	—	1	—	1	—	2	3	—
Total	8	57	61	70	31	16	35	—
Rural Non-Farm Families								
1	—	—	—	—	—	—	—	—
2	4	4	4	1	1	2	1	—
3	1	6	4	1	4	1	1	—
4	5	9	2	1	1	—	1	—
5	—	—	—	1	1	—	—	—
6	—	1	1	2	2	—	1	—
7	—	—	—	—	—	—	1	—
8	1	—	1	—	—	—	—	—
Over 8	—	—	—	—	—	—	—	—
Total	11	20	12	6	9	3	5	—

Distance From Locker Plants

Convenience of having the supply of frozen food at home is one of the advantages of home units. For this reason the distance which the owners lived from the nearest locker plant was determined. The average was 5.3 miles. Another study in Ohio showed that farmer users of lockers at commercial locker plants averaged 5.18 miles from the plant. It might be expected that those living a greater distance from a locker plant would be the first to purchase home units in order to save travel to and from the plant. The small difference of only .12 mile shown between the distances for the two groups would indicate little of this influence on purchase of home units. The home unit owners of this study are classified by number living at different distances from the nearest locker plant as shown in Table 5.

Table 5. Number of Farm and Rural Non-Farm Families Living at Different Distances from the Nearest Locker Plant.

Distance (miles)	Farm Families	Rural Non-Farm Families
Less than 3	51	43
3 to 5.99	123	11
6 to 9.99	81	8
10 or over	23	5

Further analysis shows that the owners of units who had rented lockers previous to purchasing the units live an average of 4.46 miles from a locker plant, while those who did not rent lockers previously live an average of 5.53 miles from the nearest plant. This indicates that some families probably were not renting lockers because of the distance to plants, but purchased home units when they became available. However, those families who had been renting lockers before purchasing home units were found to live on the average about the same distance from locker plants as locker renters in general. Apparently distance from the locker plant was not the most important factor in their decision to purchase their units.

Still further investigation of the relation between distance of the home unit owner from a locker plant to his purchase of a home unit indicates that of those who had been renting a locker prior to purchase of a unit slightly less than a third were continuing to rent a unit. These families lived an average of 5.24 miles from the locker plant. Those who rented previously, but discontinued renting after purchasing a home unit, lived an average of only 4.57 miles from the locker plant. This further indicates that the purchase of units was not influenced by greater distances to locker plants and the desire to get away from the driving to and from the plant, because many of those living the greater distances continued to rent lockers.

* "Frozen Food Lockers And Home Freezers In Meat Distribution" by North Central Livestock Marketing Research Committee. Regional Bul. 21, Wisconsin Agricultural Experiment Station, 1950.

Three hundred twenty-seven of the unit owners listed convenience as one of the advantages of a home unit. Having food stored at home was apparently enough more convenient than other storage that it was desirable to most families regardless of distance from a locker plant. This means that home units will likely be distributed without much relation to proximity of localities to locker plants. The 327 who listed convenience as one of the advantages of a home unit averaged 4.8 miles from the nearest locker plant.

Years of Experience With Frozen Food

All of the 356 unit owners had considerable experience with the use of frozen foods. It must be kept in mind that this differs in most cases with the length of time the units had been owned. The majority of the families interviewed had either rented lockers previous to purchasing the unit or had used frozen food from some other source. Table 6 classifies both farm and non-farm families by the length of time they had used frozen food from any source.

Table 6. Number of Farm and Rural Non-Farm Families Who Have Used Frozen Food for Stated Periods of Time.

Length of Time Families Had Used Frozen Foods.	Number of Families		Total	
	Farm	Rural Non-Farm	Number	Percent
Less than 1 year	10	4	14	4
1 to 1.99 years	47	12	59	16
2 to 2.99 years	45	17	62	17
3 to 3.99 years	31	10	41	12
4 to 4.99 years	44	3	47	13
5 to 5.99 years	32	5	37	11
6 to 6.99 years	32	6	38	11
7 to 7.99 years	13	2	15	4
8 or more years	21	5	26	7
No information	12	5	17	5
Total	287	69	356	100

Fourteen families included in the first group had used frozen food for almost, but not quite a full year.

In some of the following sections account will be taken of the influence of the length of time that frozen foods had been used in the use of home units.

Satisfaction With Size of Unit Owned

Each family was asked whether or not they were satisfied with the capacity of their unit and if they were not, what size unit they thought would be desirable for their family. Complete information concerning this was obtained from 340 of the 356 families interviewed. One hundred of the families desired units of different size from the one now in use, while 240 were satisfied. Of the hundred who wanted different sizes, 99 wanted larger units, while one family of four members, with a 40 cubic foot unit, thought a 20 cubic foot unit would be large enough. Table 7 gives data concerning present storage space and desired space.

Table 7. Number of Families of Different Size who Do or Do Not Desire a Change in Size of Unit, Average Size of Present Units and Average Size Desired for New Units.

Size of Family	Families Desiring Change			Families Satisfied With Present Unit	
	Number of Families	Cubic Feet Per Person In Present Unit	Cubic Feet Desired Per Family Member	Number of Families	Cubic Feet Per Person in Present Unit
1	—	—	—	2	10.00
2	21	4.36	7.62	47	8.52
3	17	3.51	5.80	61	5.16
4	32	2.84	4.27	51	3.99
5	14	2.81	4.48	31	3.83
6	8	1.95	3.33	24	3.25
7	1	.71	1.43	13	3.76
8	5	1.18	2.38	6	2.32
Over 8	2	1.21	2.42	5	5.48
Total	100	—	—	240	—
Average	—	2.69	3.70	—	4.48

Further analysis of the families of two to six members shows the following percentages of the families of each size who desired a change in unit capacity for their family:

Families of 2 — 31 Percent Families of 4 — 39 Percent
 Families of 3 — 21 Percent Families of 5 — 31 Percent
 Families of 6 — 20 Percent

These percentages give little indication of much difference between the smaller and larger families in the matter of adequacy of the unit owned.

The capacity per family member ranged from 1.80 cubic feet for the families of eight to 7.24 cubic feet for the families of two. From these averages it might be assumed that most of the larger families would desire large units. However, this was no more true for the large than for the small families. Thirty percent of the families of four members or less said they needed larger units, while of the larger families, only 28 percent desired larger ones.

Apparently the reason for this was that more full use was made of the units by the larger families. This will be shown in a later section dealing with amount of food stored in the units.

The data, however, indicated that for each family size those families with the smaller space per individual were generally the ones who desired more space. Those 100 families who would like larger units desired an average of 3.70 cubic feet per person, compared to the 4.48 cubic feet of space for those who were satisfied with their present unit. About the same percentage of farm and rural non-farm families indicated satisfaction with their units.

Locker Renting By Unit Owners

Of the 356 unit owners interviewed, 216 had rented lockers previous to the purchase of a home unit. One hundred forty-five of the 216 discontinued renting units, while 16 unit owners who had not rented lockers previously, started renting lockers after pur-

chasing the units. Of those unit owners renting lockers at the time of the interview, only nine signified their intention of discontinuing the use of a locker.

From a companion study* concerning use of frozen food, where a representative cross-section of the population of Ohio was sampled, it was found that five percent of all families owned home units and 11 percent rented lockers. For rural families the percentage owning home units was almost 10 percent, but for city families, only 3.5 percent.

Description of and Information on Units

Style of Units

Of the 356 cold storage units, 298 were top-opening units and 54 were side opening. There were three combination refrigerator-cold storage units and one unit the family called a walk-in unit. Each owner was asked what style unit they would purchase if they were to choose now. Only 28 stated that they would rather have some other style than one owned. Nineteen owners of top-opening units stated they would purchase side-opening units and two stated they would like a walk-in unit. Of those owning side opening units, seven said they would rather have the top-opening style. Only three of the 54 side-opening units were owned by rural non-farm families, but six other rural non-farm families would like such units.

Size of Units

Units ranged in size from 1.5 to 190 cubic feet, with the average for all units of 15.8 cubic feet. Table 8 lists the number of units by size for both farm and rural non-farm owners.

Table 8. Number and Percent of Units of Stated Size Owned by 350 Farm and Rural Non-Farm Families.

Size (cubic feet)	Farm		Rural Non-Farm	
	Number	Percent	Number	Percent
Less than 6 cubic feet	11	4	10	15
6 but less than 10 feet	57	20	21	32
10 but less than 15 feet	68	24	13	19
15 but less than 20 feet	91	32	11	16
20 but less than 25 feet	18	6	6	9
25 cubic feet or over	38	14	6	9
Total	283	100	67	100

It can be seen in Table 8 that a higher percentage of the farm families owned large units than was true for the rural non-farm families.

Three of the units had a capacity of 100 cubic feet or more and of these three, one was home built and the others were commercial makes. Since these three large units would have considerable effect on the averages, all three were left out of the computations in Table 9 showing average size of units by year of purchase.

*Project title "Consumer Acceptance of Frozen Food and Methods of Merchandising of Such Foods." Not yet published.

Table 9. Average Size of Home Units and Average Storage Space Per Family Member by Time of Purchase of Unit.

Year of Purchase	Average Size (cu. ft.)	Average Space Per Family Member (cu. ft.)
Before 1946	14.9	3.56
1946	15.3	4.03
1947	14.2	3.49
1948	14.2	3.71

These data show little evidence of change in size of units purchased from year to year. The average space per family member provided by the units showed some difference based on year of purchase, but there was no indication of a definite trend to more or less space per person from the units purchased earlier.

Of the 356 families interviewed the time of purchase of their home unit was determined for all but seven. Families were not included unless they had owned the unit for almost a complete year. The few included who had owned their unit for slightly less than a year were included as one year owners. The length of time the families had owned their units is shown in Table 10. Only ten of the families had owned units for more than 5 years.

Table 10. Number of Farm and Rural Non-Farm Families by Length of Time They Had Owned a Home Unit.

Number of Years Unit Had Been Owned	Number of Families	
	Farm	Rural Non-Farm
1	86	19
2	126	27
3	45	11
4 or more	25	10

Cost of Units

Information on cost of units was obtained from 306 owners, but the size of eight units was not stated. The cost ranged from \$100 for a converted ice cream cabinet to \$1500 for a large unit of 130 cubic feet capacity. Lowest price reported for a standard cold storage unit was \$175 for a five cubic foot box. The average cost for all units was \$439.95 with an average of \$27.30 per cubic foot of capacity.

Table 11 shows the number of units arranged by groups according to cost per unit.

Cost	Number of Units
Less than \$200	5
\$200 to \$299	53
\$300 to \$399	75
\$400 to \$499	81
\$500 to \$599	46
\$600 and over	46

Of importance to home unit owners in their cost of storing food is the cost of the unit in relation to its food storage capacity. In general the cost per cubic foot of capacity decreased with increase in size of the units—(Table 12.)

Table 12. Cost of Home Units Per Cubic Foot of Capacity by Size of Units.

Size of Unit	Cost Per Cubic Foot
Less than 6 cubic feet	\$56.32
6 but less than 10 cu. ft.	39.97
10 but less than 15 cu. ft.	34.79
15 but less than 20 cu. ft.	28.98
20 but less than 25 cu. ft.	26.35
25 cubic feet or over	17.32

The highest price paid per cubic foot of storage space was for four units of less than four cubic feet where the owners had paid \$126.24 per cubic foot. The depreciation on such units would add materially to the cost of storing food. The depreciation per cubic foot of storage space for the units of 25 cubic feet or more would be only about one seventh as much as for the four cubic foot units. On the basis of average storage per cubic foot for units in this study the depreciation would vary from 1.68 cents per pound of food stored in the very small units to 0.23 cents per pound in the units of 25 cubic feet or over on the assumption that the units should be completely depreciated over a period of 15 years.

Makes of Units

There were 59 different makes of units represented by the 356 unit owners interviewed. In addition to this, there were three old ice cream freezers, one milk cooler and three custom or home made units in use. No one make represented more than eight percent of the total. The four most popular makes owned by the 356 families accounted for 99 units or 28 percent of the total. However, these four makes accounted for only 20 percent of the total storage space of all units.

Where is the best place to keep the home unit? This question was put to the unit owners who were asked to name the most desirable place as influenced by their experience. There was no one place that was much more desirable than others as measured by the number of times each was mentioned.

Only five specific locations were mentioned as the most desirable for the home unit. The basement was stated as most desirable by 103 families, the kitchen by 81, enclosed porch by 68, utility room by 66 and some outside building by 22 families. In addition to these specific answers two families said that any place where room was available was handy enough to house a home unit.

Food Storage In Home Units

Amount of Food Stored

Information concerning the amount of food stored in the home cold storage units (for the year of 1948 in most instances) was obtained from 296 families. These families stored a total of 238,811 pounds of food during the year. Seventy-four percent of the total storage was meat and of the meat, 50 percent was beef.

Table 13 indicates the amount of products stored during the year by the 296 families.

Table 13. Amount of Various Foods Stored Per Family and Per Family Member During the Year Previous to the Interview.

	Total (lbs.)	Per Family (lbs.)	Per Family Member (lbs.)
Beef	88,265	298.2	73.9
Pork	65,432	221.0	54.8
Poultry	16,486	55.7	13.8
Veal	1,700	5.8	1.4
Lamb	1,003	3.4	.8
Fish and Game	3,473	11.7	2.9
Other Meat	100	.3	.1
Fruit	33,111	111.9	27.7
Vegetables	29,242	98.8	24.4
Total	238,811	806.8	199.8

* This was the total amount of food placed in the units during the year and not the amount in units at any one time.

Storage Per Cubic Foot and Per Person

Concern has been evidenced by some groups as to the adequacy of units purchased for storage. The usual recommendation was for the selection of units allowing five cubic feet of storage space per family member. Analysis was made of the use of the units of different sizes by families of different sizes to determine what might be adequate units based on their actual use for storage during a year's time. As might be expected, a great variation was found in the use of the units of the same size, as well as of the different sizes as shown in Table 14.

Table 14. Amount of Food Stored Per Cubic Foot of Storage Space and Per Person by Size of Family and by Size of Unit.

Persons Per Family	5 or Less	Size of Unit (cu. ft.)					Over 25.0	All Sizes
		5.1- 10.0	10.1- 15.0	15.1- 20.0	20.1- 25.0	Over 25.0		
Storage Per Cubic Foot								
	lb.	lb.	lb.	lb.	lb.	lb.	lb.	
1 and 2	98.1	73.2	49.9	41.9	28.9	10.1	42.2	
3 and 4	155.0	73.3	63.0	46.7	36.3	23.3	51.1	
5 and 6	—	112.6	65.6	54.0	47.7	37.5	53.8	
7 and Over	165.5	120.3	80.9	51.5	49.1	26.5	46.3	
All Families	138.6	83.8	61.3	46.8	39.5	26.4	49.3	
Storage Per Person								
1 and 2	215.7	288.1	329.9	354.7	342.5	431.7	313.7	
3 and 4	183.3	170.3	230.7	234.8	227.5	242.7	214.0	
5 and 6	—	166.5	165.9	169.8	201.3	221.1	182.4	
7 and Over	104.8	140.3	136.2	125.2	108.8	172.6	140.5	
All Families	150.0	184.3	215.6	207.4	198.7	202.7	200.9	

Complete data on storage of food by 290 families were available for this analysis.

In general, the families with a small amount of storage space per person used the units more fully than where more space was available. For example, the families of one and two persons with units over 25 cubic feet capacity stored only an average of 10.1 pounds per cubic foot during the year, while the families of five and six with units of 10 cubic feet or less stored an average of 112.6 pounds per cubic foot.

Families with units of more than 25 cubic feet capacity stored 34 percent more per person than families with units of five cubic feet or less. The amount of food stored per person increased as size of units increased up to and including families with 10.1 to 15 cubic feet units. Beyond that no increase was noted. Apparently by efficient use of units those of 10 to 15 cubic feet capacity were large enough in most instances. For families of five or more persons this means three or less cubic feet per person.

Use Made of Different Size of Units

Comparison of the use of different size units, without regard to family size, shows less efficient use of the space in the larger units than in the smaller ones. Use of space in units above six cubic feet capacity was compared to the use made of units of six cubic feet or smaller. In Table 15 is shown the comparative efficiency in use of units of over six cubic feet with those of less than that.

Table 15. Storage of Food Per Unit and Per Cubic Foot for Units of Different Size and Efficiency in Use of the Space Above Six Cubic Feet Per Unit.

Size of Units cu. ft.	Storage Per cu. ft. (lbs.)	Storage Per Unit (lbs.)	Percent which storage per cubic foot in additional space in larger units was of storage per cubic foot in the small units.
6 or Less	110.9	596.6	—
6.1 to 10.1	78.4	675.0	22
10.1 to 15.1	63.9	826.9	28
15.1 to 20.1	48.1	838.1	18
20.1 to 25.1	39.8	926.9	17
25.1 to 30.1	35.8	1056.1	17
30.1 to 35.1	35.1	1175.9	19

This comparison points out the less efficient use made of the additional capacity over six cubic feet by the owners of the larger units. For example, if the units in Group I were being used to practical capacity then the extra space in the units of Group VII was being used only to 19 percent of capacity.

Fruit and Vegetable Storage

Fruit and vegetables usually require more storage space per pound than meat. Since most of the year's supply is stored at one time, it is apparent that some families who wish to store a large supply of fruits and vegetables would need more space. To find what actually took place in such storage the relation of vegetables plus fruit to other storage was calculated for various sizes of units and is shown in Table 16.

Table 16. Percentage of Total Storage of Food Accounted for by Fruits and Vegetables in Different Size of Home Units.

Unit Size (cubic feet)	Fruit & Vegetables As Percent of Total Storage
5 or Less	20.5
5.1 to 10.0	24.1
10.1 to 15.0	22.8
15.1 to 20.0	32.6
20.1 to 25.0	34.7
Over 25.0	27.6
All Sizes	26.9

How much more fruit and vegetables would be stored if the smaller units were replaced by larger ones is problematical, as can be seen in the foregoing tabulation. There was little increase in percentage in fruits and vegetables to total storage beyond the 15.1 to 20 cubic foot group.

As shown by total storage, storage per person and use made of added space, it is doubtful if units of over 15 cubic feet capacity would be necessary or desirable, except in a few cases. Those with the smaller units have demonstrated that unless an unusually large amount of fruit and vegetables are stored, that large units are not necessary. Efficient use makes the smaller units satisfactory in the majority of cases. Several of the very large units were utilized only to a small percentage of capacity.

Storage as Affected by Experience With Frozen Foods

Analysis was made of the relation of time the family had been using frozen foods from any source, to amount stored in the home unit during the year previous to the interview. These figures are shown in Table 17. The few owners who had their units less than a year and had almost no previous experience with frozen foods, stored only 533 pounds, but since this represented less than a year's use it should not be compared with other groups.

Table 17. Amount of Food Products Stored for One Full Year By Length of Time Frozen Foods Had Been Used.

Number of Years Using Frozen Foods	Amount Stored Per Family During One Year
1 Year, But Less Than 2	728 pounds
2 Years, But Less Than 3	717 pounds
3 Years, But Less Than 4	855 pounds
4 Years Or More	868 pounds

This difference indicates a tendency for families to increase the use of frozen foods as they become more accustomed to its use. Therefore, it would seem advisable for families that have had little experience with use of frozen foods to make provision for storage of more food in the future than they expect to store in their home units the first year or so.

The length of time that the individual units had been in use had only slight influence on the amount of food stored per cubic foot during the year, except where the families had used little frozen food before purchasing units. Table 18 indicates the storage reported during the year previous to the interview for units in use in various periods.

Table 18. Amount of Food Products Stored Per Cubic Foot by Length of Time the Units Had Been in Use.

Length of Time In Use	Storage Per Cubic Foot
1 Year or Less	50.3 pounds
1 to 2 Years	56.8 pounds
2 to 3 Years	47.5 pounds
3 to 4 Years	66.1 pounds
4 to 5 Years	52.4 pounds
Over 5 Years	23.2 pounds

The first three figures in Table 18 are the most important in the comparison, since most of the units had been in use for three years or less. The length of time the family had been using frozen foods from all sources was more important in determining amount of food stored than the length of time the unit had been in use as shown in Table 17. Practically all unit owners had considerable experience with use of frozen foods before purchase of units.

Relationship of Beef and Pork Storage

A comparison of beef and pork storage by families who had used their unit one year, with those who had used theirs three years or more indicated a tendency for beef storage to gain slightly in percent of total. The percentage of total storage represented by fruits and vegetables was slightly lower with those families who had their units the longer period of time. However, the difference was not great enough to be of much significance. Their fruit and vegetable storage had gone up, but not quite as fast as for meat.

Effect of Past Use of Lockers on Storage in Units

Analysis of the data showed that those families who had rented cold storage lockers previous to purchasing home units stored more during the year previous to interview, than had those families who purchased units with no former experience in storage of frozen foods. Those families who had rented lockers previously, stored 863 pounds of food per family and 207 pounds per person compared to 717 pounds per family and 188 pounds per person for families who had not rented lockers previously.

Effect of Purchase of Frozen Foods at Retail on Storage in Home Units

Analysis showed that those families purchasing frozen food at retail in addition to their storage, had stored 799 pounds per family or 208 pounds per person. Those families who did not purchase such food had stored 819 pounds per family or 199 pounds per person. This shows practically no relationship between purchase of frozen food at retail and amount stored in lockers. The effect, in any event, could not have been very great since those families that purchased at retail purchased only about six packages per month or about 72 packages per year.

Sources of Supply for Unit Storage

The sources were summarized as either home produced, purchased fresh or purchased in frozen form for storage. In many cases the family had used two of the sources for the same product. Table 19 gives the number of families using each source for obtaining the products for storage.

Table 19. Number of Families Using Different Sources for Various Foods for Storage in Home Units.

	Fruit	Vegetables	Poultry	Meat	Fish
Home Produced	274	307	271	296	41
Purchased Fresh	223	33	29	65	43
Frozen	81	92	1	0	5

Not much food was purchased in frozen form for storage in units and relatively small amounts of vegetables and meats were purchased in fresh form for storage.

Dressed meats, poultry and fish were purchased by 100 families for storage. The number of families purchasing each kind of dressed meat and the amount purchased is shown in Table 20.

Table 20. Number of Families Purchasing Various Meats for Home Unit Storage and Amount Purchased.

	No. of Families	Total Purchased Pounds	Average Per Family Pounds
Beef	64	13,070	204
Pork	34	5,875	173
Veal	4	140	35
Lamb	2	120	60
Poultry	22	1,548	70
Fish	35	1,060	30

The dressed meat listed in Table 20 represented about 12.3 percent of all meat stored during the year for the 296 families from which records were obtained. Apparently home storage is not furnishing a large market for meat slaughtered by packers.

Of those families purchasing meat, 92 indicated specifically where they had made their purchases. Of this group, 43 had purchased from farmers, 13 from locker plants, 43 from retail markets and 5 from other sources. One family had purchased from three different sources and several from two sources.

Sixty-three families reported on the types of cuts of dressed meat purchased for storage. (Table 21.)

Table 21. Number of Families Reporting Various Portions of Carcasses Purchased for Storage in Their Home Units.

Portion of Carcass	Beef	Pork	Veal	Lamb
Whole Carcass	4	11		
Half Carcass	11	8		
Quarters	32			
Various Small Cuts	9	5	2	1
Hams		8		
Shoulder		4		
Leg				1

Garden or Farm Supply of Food for Freezing by Non-Farm Families

Of the 69 rural non-farm families included in the survey, 31 owned farms from which they obtained some food items for storage in their unit. In addition, some of the rural non-farm owners stored some products from their own gardens. A list of the products obtained for storage from their farms is given here:

3 obtained meat only	1 obtained meat and fruit
2 obtained fruit only	7 obtained meat and vegetables
2 obtained vegetables only	4 obtained fruit and vegetables
12 obtained meat, fruit and vegetables	

The amount of product obtained for storage by these non-farm owners was not determined, but it was possible to determine from the information given that the 69 non-farm unit owners stored considerable produce from their farms or home gardens. Table 22 shows how many of the 69 obtained all or part of each of four products from either their farms or home gardens.

Table 22. Number of Families Obtaining All or Part of Various Foods for Storage in Their Home Units from Their Farms or Gardens.
From Own Farm Or Garden

Food Stored	All	Part
Fruit	11	25
Vegetables	23	25
Poultry	30	0
Meat	23	9

This indicates that even for those unit owners who do not live on farms, home produced products comprise an important source for storage.

There were 30 of the home unit owners who said they stored no products that they had produced themselves. Table 23 brings out the differences in storage between these 30 families and those who produced all or part of the food stored.

Table 23. Amount of Food Stored in Home Units by Families Who Produced All or Part of the Food Stored and by Those Families Who Purchased All Food Stored.

	Storage Per Cubic Foot (pounds)	Storage Per Person (pounds)	Storage Per Family (pounds)
Families Producing All or Part of Food for Storage	51.7	204.8	827.8
Families Purchasing All Food for Storage	31.8	155.2	620.8

This indicates that approximately one-third more food was stored where it was possible to obtain food from their own farm, rather than having to purchase all products for storage.

Processing of Food for Storage in Units

Forty-seven percent of the families did all their own processing and freezing at home, while 35 percent reported that they depended on a locker plant for practically all of this service. Another 15 percent had part of the processing done by a locker plant and did part at home. The remaining owners used various combinations of locker plant and other commercial services and home processing. Some had the cutting and wrapping done at locker plant or butcher shops and froze the product at home. About 40 percent of all the meat stored in the home units was processed away from home.

There was some relationship between the place where the processing was done and the amount of meat stored per person. Those families having all of their processing done at a locker plant, stored an average of 160 pounds per person, while those families doing all their own processing stored 141 pounds per person. The difference

probably was accounted for by the fact that many families storing small amounts were doing all of their own processing.

On the basis of the amount of processing done by the locker plants for home unit owners as determined from this study, the locker plants as a whole probably will do more processing in total as a result of the use of home units. Analysis showed that unit owners were having slightly more processing done at locker plants than had been done previous to purchasing their home units.

The contact of the home unit owner with the locker plant from renting a locker apparently had a lot of influence on where processing for the home unit was done. Of those unit owners who were also renting lockers, two-thirds were having all of their meat processing done at the locker plant, another 18 percent were having part of it done and the remaining 15 percent were doing it at home. Of those not renting lockers, 27 percent were having all their processing done at the locker plant, 57 percent were doing it at home and the remaining 16 percent were having part done at the locker plant. Further analysis of the effect of contact with locker plants from renting lockers shows that of those who had rented lockers previous to purchasing units and then discontinued renting, 33 percent had all of their processing for the home unit done at the locker plant, while another 20 percent were having part of their processing done at locker plants. The remaining 47 percent were doing all their processing at home.

It is therefore evident that the renting of lockers, either at present or in the past, has been instrumental in bringing processing for the home unit storage to the locker plant—especially by those unit owners who are renting lockers in addition to their unit.

Effect of Source of Supply of Meat on Place of Processing

Two hundred eighty unit owners produced all their own meat for storage, while 48 purchased all meat used for storage in the home unit. In both cases, approximately one-third had all their processing done at a locker plant. Apparently the unit owners who produce their own meat depend as much on locker plants to do their processing as do those who purchase their meat from some other source. However, of the thirteen unit owners who purchased their meat from the locker plant, all but two had all their meat processed at the plant where the meat was purchased.

The relation between the amount of meat stored and the place where the unit owners had their processing done, is shown in Table 24, where the percentage of different groups (based on amount of meat stored) having their processing done at specified places is given.

As might be expected, most of those storing little meat did their own processing. Among the other groups there were only minor differences in the percent having processing done at the locker plant. This would indicate that the processing of larger amounts of meat had little to do in deciding the place of processing, except for those families storing very limited quantities.

Table 24. Percentage of Families Who Had Their Meat Processed at a Locker Plant or Who Processed it at Home by Amount of Meat Stored Per Year.

Amount Stored (pounds)	Processed At		
	Locker Plant	At Home	Other Place Or Combination of Places
0 - 299	28	60	12
300 - 499	39	16	15
500 - 699	37	42	21
700 - 899	31	48	18
900 or More	33	44	23

When Units are Most Nearly Full

Each family was asked when their unit was most nearly full and when most nearly empty. About two out of three said their lockers were kept full or nearly full all the time. This was true for those who did their meat processing at home as well as for those who had the meat processed at a locker plant. Of those who did not keep their units full all the time, most said their units were most nearly full during the fall and winter months or "butchering time," as many stated it. About two-thirds of this same group designated April and May as the months when units were most nearly empty.

Which is Easier — Canning or Freezing?

The opinion was almost universal among the unit owners that preparation of food for freezing was less work than for canning. Only seven out of 344 who made statements concerning this said they thought canning was less work and eight thought the work involved was about the same. These opinions were not asked separately for fruit, vegetables, and meat. The answers apply to the comparison of work for preparation for freezing of those products formerly canned.

Opinions Concerning Frozen Foods

Most Satisfactory Frozen Foods

Home unit owners were asked to list the frozen foods from both lockers and home units in order of satisfaction experienced with the food. Those who both rented lockers and owned units or who had experience with both reported practically no difference in satisfaction of food from the two sources. Table 25 is a summary of expressed experience with food from home units. Many unit owners named berries as one of the most satisfactory frozen fruits, without saying what kind of berries. This is carried separately in the tabulation and probably means that all kinds of berries were satisfactory, rather than pertaining to any one kind.

Only those foods that were mentioned at least twice as one of the first three choices were included. Several other foods were mentioned as one of the first three choices, but those in the table include well over 95 percent of the total storage in home units. Only those commodities listed in Table 25 are considered in the discussion below.

Table 25. Percent of Families Who Rated Various Products From Their Home Units as First, Second, or Third Choice.

	First Choice	Second Choice	Third Choice	Percent of Families Naming Product in One of 3 First Choices
FRUITS				
Strawberries	42	25	24	76
Peaches	30	19	17	56
Cherries	15	26	15	45
Pineapple	2	2	6	7
Berries	6	10	9	19
Raspberries	4	12	16	23
Blackberries	1	3	8	8
Apples for Pies or Applesauce	0	3	5	5
TOTAL	100	100	100	—
VEGETABLES				
Corn	59	17	10	78
Lima Beans	14	29	37	58
Green Beans	8	18	34	41
Peas	17	33	15	52
Asparagus	2	3	4	7
TOTAL	100	100	100	—
MEATS				
Beef	87	6	1	93
Pork	10	78	5	82
Poultry	1	12	86	63
Veal	1	2	4	4
Lamb	0	1	1	1
Fish and Game	1	1	3	3
TOTAL	100	100	100	—

The percentage figures in each column represent a different number of families since many families mentioned only one or two choices. The percentages in this column are not the totals of the three figures to the left because those in the first three columns do not represent the same number of families.

Of the fruits, strawberries were the most popular in frozen form. Seventy-six percent of those interviewed named it in one of the first three choices. Peaches were named by 56 percent as one of the three choices. Berries, other than strawberries, were placed in one of the first three choices by 50 percent of the unit owners.

Corn and lima beans were the most satisfactory foods of the vegetable group as measured by number of times mentioned, while peas and green beans accounted for practically all other mentions among the first three. Although rhubarb was mentioned frequently, it was not included in the table, because part of the unit owners classed it as a fruit and part as a vegetable. It was mentioned by about four or five percent as either first, second or third choice.

There was much less variance in meat preferences. The usual answer was beef, pork and poultry, in that order.

Throughout the naming of most satisfactory products, it was evident that the majority of families had tried only a limited number of foods in home unit storage and their preferences were influenced

accordingly. Some shift in preference might well come with more experience in storage of a wider variety of products.

There seemed to be no influence of place of processing on satisfaction of meats from storage. It was thought that processing at locker plants or other places, where good processing facilities were available, might result in more satisfaction of meat products. However, almost all families indicated satisfaction with beef, pork and poultry regardless of where the supply came from and where it was processed.

Value for Money Spent for Frozen Foods Purchased at Retail

Frozen foods were purchased from retail channels by 37 percent of the home unit owners at an average of a little over six packages per month. Two-thirds of those who purchased frozen foods thought such food was of approximately equal quality with food from their own units. One-third thought it was of inferior quality.

In spite of the almost complete satisfaction with foods from home units, only 40 percent of those families purchasing frozen foods at retail indicated that the frozen fruits gave them more for their money than other forms. Forty-eight percent indicated that the fresh form was the best buy in fruits and 12 percent thought that the canned form was the best buy. In the case of vegetables, 43 percent named frozen, 49 percent named fresh and 8 percent the canned form as the best buys.

There was little indication that the length of time that frozen foods had been used had any bearing on the opinion of which form (as purchased from the store) gave the most for the money. However, canned vegetables had lost favor with some families who had used frozen foods for more than two years.

It must not be implied from this that many families are not willing to pay a premium for frozen over fresh or canned forms. Twenty-seven percent of the families said that they thought frozen foods were worth a premium over fresh and 65 percent thought frozen products were worth a premium over canned. A higher percent of the small families than of the large families thought a premium for frozen over fresh foods was justified. This probably reflects the need for more careful spending by many large families. There was, however, no difference in attitude toward frozen over canned foods by different size families.

Willingness to Pay Premiums

Those unit owners who said they were willing to pay a premium for frozen foods were asked what premium they were willing to pay over fresh or canned foods. About 96 percent answering were willing to pay only from one to 20 percent more for frozen fruits than for fresh. The remainder were willing to pay more than 20 percent premium. Only two percent of this group were willing to pay more than 20 percent more for frozen vegetables than for fresh.

Ninety-six percent of the group were willing to pay 20 percent or less premium for frozen fruits or vegetables over the canned form, but of the remaining four percent of the families, several were willing to pay a premium of over 60 percent. In a study* comparing the price and quality of frozen to fresh and canned form, it was found that in most cases frozen foods were at least 40 percent higher in price than the other forms. This would indicate little effective demand by the home unit owners for commercially frozen foods because of price and this is substantiated by the low amount of frozen food purchased by them.

Factors Limiting Use of Frozen Foods Purchased at Retail

As further check on opinion of commercially frozen foods by home unit owners, they were asked what were the most important limiting factors in the use of such foods. Some gave two reasons and each was tabulated separately. Practically no difference was found in answers of farm and rural non-farm families and the following figures are quoted for the two groups combined:

Reason	Number of Families
Don't Need It	220
Have Own Frozen Food	55
Have Own Canned Food	52
Too Expensive	92
Miscellaneous	16

The first three reasons given amount to about the same thing—that they have their own in some form and don't need much from other sources. The answers of having their own frozen or canned foods were kept separate because it was specific indication of the source of supply which made retail purchases unnecessary. It should be made clear that these are limiting factors and only about 40 percent of the families were using some frozen foods purchased at retail. Therefore, the reasons given for limiting their use were actually prohibiting about 60 percent from using any commercially frozen foods and to various degrees limiting the other 40 percent.

Of 131 families who used commercially frozen foods, 67 percent said they expected to purchase the same amount of frozen food at retail in the future, 28 percent expected to purchase less and only 5 percent expected to increase.

Preference for Forms of Meat

When home unit owners were asked to state preference for frozen or fresh meat, 9 percent stated they preferred fresh, 18 percent frozen, while 74 percent had no preference. None of those who preferred fresh meat gave any indication that they would discontinue storing meat in home units. Apparently the advantages of storage were great enough to outweigh their preference for fresh over frozen meats. Reasons why fresh was preferred over frozen and frozen over fresh were not determined. Apparently those

*Research Bulletin 688, July 1949—O.A.E.S. in cooperation with The Ohio State University—"Price & Quality Comparison of Selected Frozen Food and Canned Fruits and Vegetables."

families who prefer frozen over fresh had been using better meat for storage than they purchased at retail for use in fresh form.

Consumption of Frozen Foods

About 51 percent of the unit owners who had used frozen foods for three years or more said their consumption of frozen foods had increased during the past three years. They estimated consumption had increased by 20 percent or more. The average for the group was 34.4 percent with several families reporting almost doubled consumption of frozen foods.

Have cold storage lockers and home units affected the amount of meat consumed by families who have used such storage? Thirty-five percent claimed their meat consumption had gone up, 63 percent said there had been no change and only 2 percent said there had been a decrease. For those who had increased, the average increase was 33 percent. Assuming that all families used about the same amount of meat previous to use of lockers and home units the increase for all families combined amounted to about 8 percent.

Not all meats were affected alike by the use of cold storage facilities. Those who reported a change in use of beef, had increased its use by about 32 percent. No family reported a decrease in beef consumption. Only half as many families reported any change in use of pork and the average increase of those reporting a change was 19 percent. Seven families reported less pork used. One-fourth as many families reported a change in poultry consumption as reported a change in beef. The average increase in poultry consumption for these families was 34 percent. No family said they were using less poultry than previously. About two-thirds of the increase in consumption of meat was beef. Approximately one-fifth of the increase was pork. The remainder was accounted for by poultry, veal, lamb and various other meats.

The outstanding influence of frozen food storage on meat consumption has been on beef. Not only has it been the top choice of frozen meats by a large majority of locker renters and home unit owners, but also has been boosted by the fact that freezing affords a method of keeping beef in fresh form for a long period. The keeping of large quantities of beef was a major problem before freezing. Freezing makes it possible for families to utilize quarters, halves, etc. of beef and still maintain the quality of the meat.

This study indicates that other meats have not suffered from the increased use of beef, but that the consumption of all meats had increased for families using frozen storage facilities.

There was no indication that the source of supply of meat for storage had any bearing on changes in consumption. Approximately the same proportion of those who purchased meat for storage had increased their consumption as of those who produced their own meat.

There was found to be a direct relation between what the unit owners thought concerning the savings in the use of units and their consumption of meat. One-half of those who thought there was a

considerable saving in home unit storage had increased meat consumption, while only one-fifth of those who thought there was little or no savings had increased consumption. This would indicate that some families were using home unit storage as a means of increasing meat consumption (at least, in their opinion) by lowering the cost of the meat.

The increase in consumption of frozen foods came from both an increase in storage of foods in lockers or home units and an increase in purchase of frozen fruits and vegetables in retail stores. However, of those families who purchased commercially frozen food, 56 percent had increased their total frozen food consumption while of those who purchased no such food at retail, only 49 percent had increased their consumption.

Families with home units of ten cubic feet or less increased their consumption of meats slightly more than did the families with larger units.

A detailed analysis was made to see if there was any relation between size of home unit owned and the purchase of frozen food at retail. Of those families with units under eight cubic feet capacity, one-half were purchasing frozen food at retail, while of those families with units of over eight cubic feet capacity, one-third were purchasing such food. Apparently the small units were falling a little short of furnishing enough storage to satisfy demand for frozen foods or the families thought it would be more economical to purchase certain frozen foods than to purchase fresh foods for storage, and as a result, purchased smaller units. The former is the most likely answer, as it was found that the smaller units were used much more fully than the larger units. The owner of larger units, in many instances, used just as much commercially frozen foods as the owners of smaller units. The big difference was in the percentage of the two groups using such food.

Frozen food consumption was increased over a three-year period previous to the time of the study by 57 percent of the families with more than four persons, while only 47 percent of the families of four persons or less had increased. For both of these groups reporting increases the average increase in consumption was approximately one-third.

Opinions and Suggestions Concerning Units

Of the 356 unit owners contacted, only three were not satisfied with the storage of food in their unit. This means that the opinions concerning different features of home unit storage were not influenced by dissatisfied users. As stated in other sections, however, some of the unit owners wanted different sizes of units or different types, but were not dissatisfied with unit storage.

Advantages and Disadvantages

Unit owners were asked to state in their own words what the advantages and disadvantages of using a home unit were. Few disadvantages were listed, but on the average the owners listed

about two advantages. The following list of advantages gives the number of times each was stated.

Convenient—329	Fresh Food Available—28
Saves Labor—76	Saves Time—28
Economical—66	Food Always On Hand—18
Better Food—90	Furnished Variety—10
Saves Food—47	

Some of these advantages are similar, but were kept separate where a shade of difference might be indicated.

Every unit owner was impressed by the convenience of the home units and about two-thirds stated this as their greatest advantage. Even those who lived close to locker plants named convenience as the greatest advantage of the units.

Six owners said they had some trouble with their units and three thought they were too costly to operate.

Analysis was made to see if there was any correlation between the stated advantages of home units and any change in amount of meat used. Practically no such relationship was found to exist.

Cost of Operation

An attempt was made to gather actual operating cost records from the unit owners, but so few had any exact records that it was necessary to get their estimate, rather than accurate records. Estimates made were only for power costs in running the units. These estimates are presented in Table 26 on the basis of classification of units by size.

Table 26. Power Cost of Operating Home Units of Various Sizes Based on Estimates or Actual Figures Furnished by Owners of the Units.

Size of Units	Highest Estimate Per Unit Per Month	Lowest Estimate Per Unit Per Month	Average Estimate Per Unit Per Month	Average Estimate Per Cu. Foot Per Month
6 Or Less	\$3.00	\$0.35	\$1.27	\$0.250
6.01 to 9.99	3.00	.50	1.16	.145
10 to 14.99	4.00	.35	1.46	.178
15 to 19.99	5.00	.60	1.47	.089
20 and Over	6.00	.40	1.91	.052
All Units Average			\$1.53	\$0.095

The most important point concerning these figures is that in general most users estimate such a low figure. This is indication that few users thought the power costs were a large cost item.

Savings Made by Use of Unit

Following up the question on cost of operating a home unit was one pertaining to savings realized by using the home unit. Only two unit owners placed a cash value on savings—one of \$25 per year and the other of \$50. Most of the answers were rather general, but indicated that most of the owners thought real savings

of some kind were realized by them. Below are listed the answers condensed as far as possible without destroying the difference in meanings:

Stated Saving	Number Stating
Quite a Saving	55
Some Saving	135
Little Saving	17
No Saving	34
No Food Waste	15
Saving of Trip to Locker Plant or Market	34
Saving of Time	33
Bulk Purchase Saving	15
Save On Home Grown Food	22
Saving By Preserving Quality Better	14
Saving In Work	8
Better Living	69
Convenience	14
Miscellaneous Answers	27

The first three answers given are only degrees of savings in general. Several of the other answers indicated indirect savings by resulting in better food, less work in preparation or ability to save food, which would otherwise be lost. While these tabulations furnish no dollar and cents measure of saving, they indicate the thinking of those families using the home units. Some were thinking of units not as an added expense, but as paying for themselves in actual savings or in convenience or saving of labor or in better food quality.

Effect of Past Use of Lockers on Purchase of Units

Such a large number of the present unit owners had rented lockers previous to purchasing the units that analysis was made to determine whether or not their opinion of the locker plants had anything to do with their decision to purchase home units. Information was obtained from 206 families concerning their satisfaction with the locker plant where they had been or were still renting. Two-thirds of these families said they were satisfied with locker plant storage. However, many of these families said that the inconvenience of travel to the locker plant was their main reason for purchasing units. The remaining one-third of the 206 families had definite objections to locker plants or their operation. In spite of these objections, about one-fourth of the latter group continued to rent lockers, which were almost as high as for those who had no definite objections.

On the basis of this analysis it was apparent that home units were purchased more for convenience and other advantages, than as a result of dissatisfaction with locker plant operation.

Suggested Improvement in Units or Unit Storage

Most of the unit owners expressed satisfaction with the use of home unit storage when asked for suggestions for improvement. Suggestions were made by an appreciable number of families for some system of racks, shelves, or compartments for separation of food. It was also stressed by several families that careful preparation of food for storage paid dividends in the quality of the stored food. Other suggestions were for small technical changes making the unit more handy or more serviceable, and in development of better or more suitable packages and wrapping material.

Summary

Home cold storage units have come into use largely since 1945. This study was conducted to learn something about their use, while such information can be of constructive use to those interested in the use of such storage. The study was limited to rural families of Ohio.

Most families were more impressed by the convenience of units than with any other of their advantages. It was gathered from the statements of the unit owners that anything that would add to the convenience of the unit would be appreciated.

It was found that the families who owned units lived just about the same distance from locker plants as those families who rent lockers only. This indicates that units were not purchased primarily because of distance necessary to travel to a locker plant.

Information gained from size of units owned by different families indicates that units with considerably less than 5 cubic feet per person are generally large enough. There was so much variation among families in their use of units that no general recommendation as to size could safely be made. However, it was possible to generalize that the larger families could get along satisfactorily with less space per person than could the smaller families. The smaller units were nearly always used more efficiently than the larger and the larger families made more efficient use of their units than the smaller families.

Families that had not used frozen foods extensively in the past should make provision for more storage than may be thought desirable during the first year of use. The data concerning storage showed that families with three or four years' experience with use of frozen foods stored about 20 percent more than families that had used a freezer but a short time.

The storage of fruits and vegetables increased in total and in percent of all storage in units as size of units increased up to about 25 cubic feet. Beyond that size the percentage decreased, but total storage increased. Families who expect to store sizable supplies of fruits and vegetables should purchase larger units in relation to total storage contemplated, than should the families who expect to store meat primarily.

Only one-eighth of all meat stored in home units was purchased in dressed form. This indicates that such storage is not furnishing an important outlet for meat slaughtered by packers.

Those families that produced most of the food for storage on their own farm stored about one-third more than those who bought all of it, indicating that most families look upon units primarily as a way to preserve their own food, rather than as a way to save money on foods by purchasing in large quantities.

The total processing done by locker plants for home unit owners was more than the loss of processing formerly done for those renters who purchased units and discontinued use of lockers. Any loss of income by locker plants, due to the use of home units, was therefore confined to loss of locker rental and some incidentals, rather than to loss of processing.

Strawberries, peaches, and cherries were the most popular fruits stored in home units; corn, lima beans, green beans, and peas the most popular vegetables and; beef, pork and poultry by far the most popular meats. Use of units among rural families has increased the consumption of beef and poultry by a larger percentage than for lamb and pork.

Only four percent of the unit owners who expressed willingness to pay a premium for frozen foods over other forms at retail were willing to pay more than a 20 percent premium. Since a former study of prices of foods in frozen and other forms showed 40 to 50 percent higher average prices for the frozen form, it is evident that these families constitute little effective demand for frozen foods at retail. This is substantiated by the low amount of frozen foods purchased by these families.