



6-1955

## **A study of the sales of milk through outdoor milk vending machines in Knoxville, Tennessee, 1954-1955**

John C. Carter

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To the Graduate Council:

I am submitting herewith a thesis written by John C. Carter entitled "A study of the sales of milk through outdoor milk vending machines in Knoxville, Tennessee, 1954-1955." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Agricultural Economics.

M. Lloyd Downen, Major Professor

We have read this thesis and recommend its acceptance:

Joe A. Martin, Thomas B. Harrison, E. J. Long

Accepted for the Council:

Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

May 12, 1955

To the Graduate Council:

I am submitting herewith a thesis by John C. Carter "A Study of the Sales of Milk Through Outdoor Milk Vending Machines in Knoxville, Tennessee, 1954-1955." I recommend that it be accepted for nine quarter hours of credit in partial fulfillment of the requirements for the degree of Master of Science, with a major in Agricultural Economics.

W. Lloyd Downen  
Major Professor

We have read this thesis  
and recommend its acceptance:

W. A. Martin  
Thos B. Harrison  
E. J. Long

Accepted for the Council:

J. H. Winters  
Dean of the Graduate School

A STUDY OF THE SALES OF MILK  
THROUGH OUTDOOR MILK VENDING MACHINES  
IN KNOXVILLE, TENNESSEE, 1954-1955

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A THESIS

Submitted to  
The Graduate Council  
of  
The University of Tennessee  
in  
Partial Fulfillment of the Requirements  
for the degree of  
Master of Science

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by  
John C. Carter  
June 1955

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33

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To the Housewives of Knoxville and those engaged in milk distribution, appreciation is expressed for the kindness and assistance offered.

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## CHAPTER I

### INTRODUCTION

Increased per capita milk consumption is of major interest to health authorities and the dairy industry. A relatively low volume of milk is consumed daily by the people of Knoxville, the amount being around 0.7 of a pint a day (table I). Calcium is one of the two nutrients most lacking in the American diet.<sup>1</sup> Milk is the best source of this mineral, and it is practically impossible to obtain the daily requirement of calcium unless milk or dairy products are eaten. To receive the calcium equivalent of one quart of milk, a person must consume 1-1/2 pounds of kale, 39 eggs, or 28 oranges. Teenagers should drink one to 1-1/2 quarts of milk each day because of their need to store calcium, phosphorus and protein.<sup>2</sup>

Recognizing these conditions, the dairy industry has attempted to make milk more available to the American public. Availability of milk has been improved through the use of outdoor milk vending machines. This method provides fresh, cold milk 24 hours a day, seven days a week. Although a number of innovations are being made in the field of milk merchandising, this study deals solely with milk sold through outdoor vending machines in the Knoxville area. This means of service has not

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<sup>1</sup>Ruth McClung, "Selling More Milk Through Dairy Council," talk made before Midwestern Milk Marketing Council at Knoxville, Tennessee, April 7, 1954, p. 14.

<sup>2</sup>Ibid., p. 12.

TABLE I

DAILY PER CAPITA CONSUMPTION OF MILK PRODUCTS AND PERCENTAGE DISTRIBUTION  
BY PRODUCTS, 28 URBAN MARKETS, UNITED STATES, 1944<sup>a</sup>

Market	Daily per capita consumption			
	Total milk products	Percentage distribution		
		Whole milk	Milk drinks	Cream
	<u>Pints</u>	<u>Pct.</u>	<u>Pct.</u>	<u>Pct.</u>
Middle Atlantic				
New York				
Utica-Rome	0.98	96.0	2.6	1.4
Syracuse	.84	97.3	1.2	1.5
New Jersey				
Entire State	.86	95.7	2.1	2.2
East North Central				
Ohio				
Cincinnati	.69	88.4	9.3	2.3
Columbus	.76	88.4	8.6	3.0
Illinois				
Chicago	.83	89.4	5.4	5.2
Springfield	.78	88.1	7.0	4.9
Wisconsin				
Milwaukee	.83	93.7	3.4	2.9
South Atlantic				
Virginia				
Richmond	.57	96.5	2.6	1.8
Roanoke	.59	83.2	15.5	1.3
North Carolina				
Charlotte	.54	91.4	7.3	1.3
Winston-Salem	.67	81.4	17.9	.7
Georgia				
Atlanta	.59	77.3	21.3	1.4
Savannah	.44	95.7	3.4	.9
Columbus	.53	80.7	18.5	.8
East South Central				
Tennessee				
Memphis	.65	80.4	17.9	1.7
Nashville	.72	74.2	23.6	2.2
Knoxville	.69	81.7	17.3	1.0
Chattanooga	.62	80.2	18.2	1.6
Alabama				
Birmingham	.51	81.3	17.5	1.2
Mobile	.52	92.7	6.5	.8

TABLE I

DAILY PER CAPITA CONSUMPTION OF MILK PRODUCTS AND PERCENTAGE DISTRIBUTION BY PRODUCTS, 28 URBAN MARKETS, UNITED STATES, 1944<sup>a</sup> (CONTINUED)

Market	Daily per capita consumption			
	Total milk products	Percentage distribution		
		Whole milk	Milk drinks	Cream
	<u>Pints</u>	<u>Pct.</u>	<u>Pct.</u>	<u>Pct.</u>
West South Central				
Arkansas				
Little Rock	0.60	84.3	12.7	3.0
Louisiana				
New Orleans	.57	97.0	1.4	1.6
Shreveport	.64	85.4	12.1	2.5
Oklahoma				
Tulsa	.71	88.4	9.1	2.5
Texas				
Dallas	.80	86.2	10.9	2.9
San Antonio	.58	93.0	2.9	4.1
Fort Worth	.75	87.4	10.1	2.5

<sup>a</sup>Source: Nonfarm Consumption of Fluid Milk and Cream, U.S.D.A., A.M.S., Marketing Research Report No. 72, May 1954.

been introduced to supplant the long established route delivery or store sales but to provide a convenient supply of milk to fill those needs not satisfiable through regular procurement.

#### Statement of the Problem

The acceptability of outdoor milk vending was the question in the minds of a number of milk producers and retailers. The innovation had met with success in other parts of the country and a new market for fresh milk was being realized. How would it work in Knoxville?

The purpose of this problem was (1) to study the organization and service rendered by one of the outdoor milk vending concerns of Knoxville, (2) to obtain customer reaction to the service rendered, (3) to interview a cross-section of the buying public to obtain their reactions to this service, (4) to compare local sales results and reactions with results from other parts of the country.

#### Importance of the Study

The diet of our nation - child, adolescent, and adult - is of growing importance. The dairy industry, long recognized as a supplier of major food, is awakening to the need for improved merchandising techniques and better methods of sales if this nation is to increase its per capita milk consumption. National studies are showing dietary deficiencies in all groups of people and milk is recommended for child and adult alike.<sup>3</sup>

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<sup>3</sup>p. E. Ramstad, et al, "Automatic Merchandising Increases Milk Consumption", Cornell University School of Nutrition (Ithaca, New York, September, 1951), p. 4.

To be really acceptable, milk should be fresh and cold. Quality is important for increased sales, and vending possibly will take its place as a means of supplying a high quality product whenever needed.

A milk surplus which has existed during the past two or three years, due primarily to increased production, will be neutralized when this and other means of new market creation are established. Since this means of service is relatively new, no previous study of this type has been made in the Knoxville market. It should be of some value to the industry.

#### Analysis of the Problem

To maintain the problem in the proper perspective, it must be recognized that the business of outdoor milk vending in Knoxville was started in 1954 and the national innovation has no more than two years' experience on an operating basis. To create, measure, and satisfy a market takes more time than has elapsed in the Knoxville area. The trial and error method is long and tedious and the combination of factors which make for success may be more easily recognized by disinterested parties than those burdened with the responsibility of making decisions.

This study embraces one small operation as it exists and its history. It also endeavors to portray the general public reaction, which may assist in evaluating the market as a whole.

#### Method of Procedure

1. Conferences were held with the owners of the business to obtain



a general explanation of the business operation, its plans, past occurrences, guidance and assistance.

2. Time was spent accompanying the service man on his daily route to become acquainted with the equipment, market, and the buying public.

3. Effort was made to determine the area served by each unit and to interview those who supervised the machines.

4. A study of population density, traffic flow and adjacent grocery stores was accomplished to evaluate location.

5. Questionnaire postcards were prepared and attached to the milk cartons to gain some insight into customer reaction.

6. Zones of survey were established in each machine area and a house-to-house, block-by-block survey was accomplished in an effort to obtain a cross-section population reaction.

7. Other areas were contacted to obtain reports of organization and progress.

8. Background reading was accomplished to learn as much as possible of the outdoor milk vending development.

9. An analysis of the data, both local and national, was prepared and evaluations and findings were reported.

10. Equipment manufacturers were contacted to obtain specifications of the latest outdoor units.

#### Factors Affecting Development

The recent nature of outdoor milk vending was the first limiting

factor. Very little has been published and the time lapse has not permitted an accumulation of data that advanced approved practices. Those few who had results from established operations were not willing to pass along a report of their transition.

Each area will have specific problems so that techniques or practices which succeeded among one group of people may not be readily acceptable in another area. For instance, a successful operation built in Knoxville may not work at all in a town in New Hampshire, for the people may be stimulated by different methods of merchandising. Those factors rendering sustained stimuli for a given community must be determined for each new enterprise.

Limited finances will force a course of action when a more successful, but more costly, alternative is at hand; money to be invested in developing a market must in this case, as all others, be considered a limiting factor.

Preconceived ideas of what the community will accept or forcing a product by size, price, or location will often close the door to early development. A constant re-evaluation is required to keep this from being a limiting factor. The mission of the one-owner business is profitable operation. If the item being sold is really needed and used, then alert merchandising will find the proper combination of factors for desired results.

The basic problems of this business are no different than any other which was started in a supplemental role. Education of the purchasing public is an emphatic limiting factor if it is not accomplished.

Size of Market or Concentration of Population Required  
for Successful Business

The most success in milk vending has been accomplished with indoor or captured markets and the greater part of published reports deal with this group. The outdoor milk vending machine requires a much larger concentration of population in a given area in proportion to its size than the indoor unit. The gauge used by a number of new operations is four thousand population within a mile radius, but other outlets, availability of change, and easily accessible parking space are also very important to location success.

## CHAPTER II

### REVIEW OF LITERATURE

#### Origin and Development of Vending Machines

Outdoor vending proved to be very unsuccessful prior to World War II. The reason for this failure was largely due to poorly designed equipment and particularly to the coin handling devices which offered the primary control of the vending machine and greatly influenced its operation.<sup>1</sup> Continued patronage could not be built on the chance that each machine might or might not function. Vending through a "silent salesman" dates back to the early twentieth century with the innovation of one-cent bulk peanuts and coated balls of chewing gum. Progress in the field was relatively slow until 1939 when public recognition and confidence in automatic merchandising caused rapid yearly increases. World War II delayed production of new and varied equipment which has appeared on the market since 1946. This was also the first year the New York Stock Exchange recognized the new industry and sold its stock. Today, automatic merchandising is an accepted growing business.<sup>2</sup>

The established business of outdoor milk vending came about in 1953, when several companies, in ideal locations, began reporting successful results. Many years of experimentation and development have gone into

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<sup>1</sup>Letter from D. C. Meyer, President, Meyer-Blake Company, St. Louis, Missouri, to John Carter, dated January 24, 1955.

<sup>2</sup>G. R. Schreiber, "Canteen Marks 25th Birthday," Vend Magazine, 8: 46-48, November 1954; Editorial, "Tooth "N" Nail Selling Builds Vending," Vend Magazine, 8: 76-79, November 1954.

perfecting the equipment on the market today. Mr. A. C. Woodruff, the inventor of the Ideal Dispenser (the first indoor milk vender), had seventeen years in design, manufacture, and operation of milk vending equipment when he invented a compact, horizontal vend, outside milk machine which was placed on the market during the summer of 1954.<sup>3</sup> Today about twelve companies are manufacturing reliable outdoor milk vending machines.

As the per capita fluid milk consumption in the United States dropped each year from a peak in 1945, dairymen and milk distributors have worked toward the development of new markets for their products.<sup>4</sup> After the Korean conflict, competition among milk distributors increased making it necessary to grant additional service or furnish new equipment to retail outlets if accounts were to be retained.<sup>5</sup> Small local dairies were not able to meet the competition from out-of-town, brand-name companies and were suffering. Merchandising milk through vending machines in factories, service companies, offices, and schools was presenting a profitable sales outlet for some dairy companies. Dairymen, with an eye on the problem and the future, pondered the difference in acceptance of vended milk sold to the indoor (captured) market and the outdoor (impulse) market.

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<sup>3</sup>Letter from L. P. Hartzler, Assistant Sales Manager, Dari O Matic, Inc., Los Angeles, California, to John Carter, dated January 27, 1955.

<sup>4</sup>p. E. Ramstad, et al, op. cit., pp. 3-7.

<sup>5</sup>Feature Editorial, "Distributing Milk through Automatic Dairies," The Milk Dealer, Collection of Milk Vending Feature Articles, The Olsen Publishing Company, 1954, pp. 14-19.

## Development Technique and Use of Outdoor Milk Vending Machines

Outdoor milk vending has been functioning for three years in the more densely populated areas of this nation. There has been a wide variance in the success this new enterprise has enjoyed, depending on the conditions under which the milk has been vended. There is need for study of specific conditions surrounding the development of each of these innovations.

The majority of outdoor milk vending managers agree this means of merchandising creates a new market for their product and will help to increase the national consumption of milk. To better understand the dissemblance of development, conditions in several areas of the United States will be given.

### Trends of Midwest United States

Mr. Paul D. Learn of the Learn Dairy Company in Oak Park, Illinois, a suburb of Chicago, switched over in part to automatic vending during 1952 because competition in stores was becoming too keen and a loss of business was being suffered through demands of storekeepers to handle name brands.<sup>6</sup> The project started small, at first, having no precedent in Illinois, but careful planning and placement of machines has produced good results. Learn has seven automatic units today that have proved to be profitable. The property adjacent to his dairy store formerly housed

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<sup>6</sup>Ibid., p. 14.

a gasoline station and on the ledge which previously supported the gasoline pumps, was placed the first outside automatic vender of its kind in the state. Half-gallon sales through this machine, which could be operated without getting out of the car, continued to climb and failed to affect the volume of sales in the dairy store just a few feet away. This vending location now averages from 100 to 150 half-gallons a day with no effect upon the store. This first installation was made in July 1952; two more were installed in September, another in October, and three in April 1953. The machines now account for 90 percent of the half-gallon sales and approximately 20 percent of the total dairy volume.<sup>7</sup> This success was due to placement of units in areas of need and to good merchandising, as well as an understanding of the patrons served.

The Farmer Cooperative Service of the United States Department of Agriculture published a very encouraging account of the Land O'Lakes Creameries, Inc., of Minneapolis (Appendix A) which highlights its success in outdoor milk vending that began early in 1952.<sup>8</sup> These data include an outline to guide and encourage a prospective enterprise but does not touch on the study of an area to determine its ability to support outdoor milk vending, the beginning problems, or the transition of development required in areas of lesser concentration. This material has been misleading to a number of people for its success has far exceeded any others

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<sup>7</sup>Ibid., p. 16.

<sup>8</sup>Stanley F. Krause, "The Mechanical Cow Sells Milk," News for Farmer Cooperatives, United States Department of Agriculture, April 1954.

which have been reported. The favorable possibilities have accelerated enterprise development and few have hesitated to consider a comparison in areas, as well as the fact that figures and business description of Land O'Lakes were published after two years of balanced operation.

#### Trends of Northeastern United States

Studies accomplished in New Jersey, Connecticut, and New York have shown a good potential for outdoor milk vending machines, but the volume in none of these states reached that of the Midwest United States.<sup>9</sup> The Connecticut study indicated a slow progress.<sup>10</sup> In a September 1954 report, Dr. Stewart Johnson, Professor of Agricultural Economics, University of Connecticut, showed one firm with one outdoor machine to be the state total in September 1953; in May 1954, there were four firms with a total of five outdoor machines; and in September 1954, there were five firms showing a 26 machine total. Two of the four firms operating machines in May 1954 are no longer in business because sales were too low and did not justify continued operation. However, three new firms were established in the state between May and September 1954 with an average of seven outdoor

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<sup>9</sup>Stewart Johnson, "The Marketing of Milk Through Vending Machines - Problems, Possibilities, and Outlook" talk made before 47th Annual Convention of Milk Industries Foundation, Atlantic City, New Jersey, October 26, 1954; Feature Editorial, "Highest Vending Sales Ever," The Milk Dealer, Collection of Milk Vending Feature Articles, The Olsen Publishing Company, 1954, pp. 36-41.

<sup>10</sup>Stewart Johnson, "Experiences in Machine Vending of Milk," The Milk Dealer, Collection of Milk Vending Feature Articles, The Olsen Publishing Company, 1954, pp. 23-25.



milk vending machines each. The locations of the September 1954 total run true to form with other operations around the nation, with 19 at gasoline filling station, three at housing projects or apartment areas, and one each at a bakery, super-market parking lot, trailer camp, and the yard of a milk-processing plant. The average volume of daily sales for the 26 machines was 46 units (quarts or half-pints).<sup>11</sup>

Mr. Ben L. Simon, President of the City Milk Vending Corporation of Long Island, New York reported a start with five machines in 1937, had grown to 70 in February 1953, and is reported to have about 100 machines today. The corporation has found servicing their machines to be quite important. A recording device was installed on each machine that indicated the time of purchases and from these data each machine was serviced just before a heavy sales period. City Milk Vending's units were sometimes installed in basements, halls, or foyers of buildings and could be considered inside units, but they service home customers purchasing in quart containers just as the larger outdoor units. City Milk vends quarts at about four cents below the home delivery and about one cent below the store price. The apartment machines, which hold only 140 quarts, were serviced at least once a day and sometimes two service calls were necessary.<sup>12</sup>

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<sup>11</sup>Stewart Johnson, "Milk Vending and Dispensing Machines in Connecticut," Dairy Marketing Report, Department of Agricultural Economics and Farm Management, University of Connecticut, September, 1954.

<sup>12</sup>Stewart Johnson, op. cit., "Experiences of Machine Vending of Milk," pp. 24-25.

The Johanna Farms in New Jersey, using the outlet Milk-O-Mat Distributors, Inc., placed six outdoor machines in the Trenton area in October 1953 and increased that number to 20 during May 1954. At the beginning, single quarts in paper containers were sold at one cent above the milk price in grocery outlets; a change problem existed due to pricing on the half-cent but this was solved by attaching tokens to the containers, redeemable at machine location. Incidentally, only 5 percent of the customers took time to redeem the tokens. Most of the sales were being made between 5:00 and 10:00 p.m. indicating that working couples and homeward bound factory workers found the outdoor milk vending machines better able to meet their needs. There were impulse customers, those of the neighborhood desiring milk only and wanting to avoid the super-market crowds, the theater-goer returning home, and the household with a depleted milk supply and no one wishing to dress up to go to the store. Mr. Weeck, Manager of Milk-O-Mat Distributors, Inc. said, "The higher price which vended milk obtains does not seem to be a deterrent to sales, for people are willing to pay a little extra for the added convenience which the automatic dairy affords."<sup>13</sup> In April of 1954, the Milk-O-Mat Distributors, Inc. were converted to two-quart vends for 45 cents which corresponded with store prices. Sales in May of 1954 averaged 90 quarts per day for 20 machines. Sixty percent of the weekly sales come between Saturday noon and Sunday midnight.<sup>14</sup> Mr. Weeck again stated in an interview with

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<sup>13</sup>Feature Editorial, "Automatic Dairies Build New Business," The Milk Dealer, Collection of Milk Vending Feature Articles, The Olsen Publishing Company, 1954, pp. 50-53.

<sup>14</sup>Stewart Johnson, op. cit., "The Marketing of Milk Through Vending Machines - - Problems, Possibilities, and Outlook," p. 7.

The Milk Dealer representative for a feature Vend story,

Sales have been very successful since the first unit was installed in October 1953. In order to be profitable, sales per machine should average one hundred quarts a day. We're satisfied with our sales at the present time; however, we expect business to really boom when spring and warmer weather arrives. Things look bright and for the future we have one thought in mind. Continued expansion of the automatic dairy phase of our business.<sup>15</sup>

Dr. Stewart Johnson did not agree with Mr. Weeck when Johnson said,

Some Eastern operators who have charged more than the store price for milk have been disappointed because sales were only a small fraction of the well-publicized Land O'Lakes average of two hundred seventy-eight quarts daily, in which prices out of the machines were about one cent a quart lower than the store price. With a slightly higher price out of machines than at the store and the same as for home-delivery milk, Connecticut experience points toward a sales volume of about fifty quarts a day. At the same price as at stores, New Jersey experience points toward a sales volume of ninety quarts a day. Only when at discount from store and home-delivery prices have regular-customer purchases been high enough to push daily volumes to the 300-quart level.<sup>16</sup>

#### Potential Capabilities of the New Model Milk Vending Machines

The year 1955-1956 will find the best designed, most efficient equipment since the innovation of outdoor milk vending machines. All the major problems have not been solved but about a dozen companies have introduced successful outside units. Some of the features which most boxes offer this year include at least two independent vending units, containers of milk vended in an upright position, units stoutly constructed

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<sup>15</sup>Feature Editorial, op. cit., "Automatic Dairies Build New Business," pp. 51-52.

<sup>16</sup>Stewart Johnson, op. cit., "The Marketing of Milk Through Vending Machines - - Problems, Possibilities, and Outlook," p. 12.

and insulated for dependable service, storage space for extra milk, simple and quick to load, can sell at odd cent prices, and have thermostatically controlled heating and cooling units to keep the milk in a range of 32° to 36°F. Most of the machines are of all aluminum construction and most manufacturers are building two sizes which meet the needs of large and small demand areas.

The features which have not been perfected are coin mechanism to handle a 50 cent piece, construction of machine to facilitate purchasing from the car, protection of the customer during inclement weather by using overhanging roof and a paper bag dispenser on machine for carton handling.

The advancement of equipment production now exceeds the development in the field. Many of the glowing accounts of immediate success originate with zealous equipment salesmen. If this problem is not carefully handled, it will greatly lengthen the time period for development of this new enterprise.

#### Outlook for 1955

The dynamic growth of automatic selling has taken place since 1946.<sup>17</sup> There are many predictions of continued success, but with most of the optimistic outlook there are words of caution. Dairies that have placed machines too quickly have learned that automatic selling is a specialized

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<sup>17</sup>G. R. Schreiber, "Automatic Selling," A Report on Developments in Milk Vending and Dispensing, American Dairy Association, December, 1954.

business and requires a detailed pre-operational study as well as a specialist to train service personnel.

This new method of retailing milk is in an embryonic stage and can move toward success or failure depending on the motives of its operators. There are investment opportunities but only as long as a real service is offered to prospective consumers. Selfishness, short-sightedness, or a lack of good merchandising technique will not open the doors of many communities and the new business will wither. G. R. Schreiber, Editor of Vend Magazine, is very optimistic about automatic selling of milk in large outdoor venders but does not give an established basis for his outlook. Interest is increasing rapidly in this field and in another year more facts will be available on which to base conjectures. Regardless of the impressions and positive leadership offered by the equipment manufacturers, there remain two conflicting views pertaining to outdoor automatic milk vending. From an automatic merchandising convention this statement was made, "Merchandising milk . . . through vending machines has ranged from very good to unprofitable." Optimism and caution reflected across the nation point up the fact that outdoor vending of milk is still in an experimental stage as a new national business. The innovation has secured sound profitable acceptance in several areas but as a general rule, firm profitable conditions are not enjoyed by all.

In speaking of milk vending generally, one sometimes includes the indoor market, which has progressed more rapidly than the outdoor automatic venders. The National Automatic Merchandising Association reported the value of milk vended through coin machines in 1954, \$22.4 million, was a 32 percent increase over 1953, but milk accounted

for only 1.5 percent of the value of all goods vended in the United States in 1954, and of the total milk consumed in the United States, only .25 percent was sold through coin-operated vending machines.<sup>18</sup> Some of the conflicting interpretations in statistics released by the National Automatic Merchandising Association last fall arise from a combination of all types of milk vending or dispensing equipment being treated as a group rather than having each type of service reported separately.

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<sup>18</sup>Stewart Johnson, op. cit., "The Marketing of Milk Through Vending Machines - - Problems, Possibilities, and Outlook," p. 1.

## CHAPTER III

### CHARACTERISTICS OF THE LOCAL MARKET

#### Method of Establishment of the Knoxville Market

Vending milk for home consumption, from outdoor machines in Tennessee, was first introduced in Knoxville during 1954. Much interest was created by this innovation. Dairymen, milk distributors, and vend operators carefully observed the machines to determine the attraction of the Knoxville populace. A number of reports had been published in trade magazines concerning this service, but no one was aware of the local market reaction because several conditions exist in Knoxville that do not occur to the same degree elsewhere.<sup>1</sup>

The operation embraced by this study was begun in July 1954 and consisted of six large, single-selection, outdoor boxes. The co-owners investigated the market only slightly prior to operation, although a short study was made of similar businesses elsewhere. The United States Department of Agriculture, Land O'Lakes report weighted the decision for immediate operation.<sup>2</sup> Selecting location and placement of equipment was dependent on station operators who would agree to installation of a unit on their premises. Population density and traffic flow were considered in placement of machines, but no authoritative data were secured for

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<sup>1</sup>Having lived in areas under discussion, the statement is based on author's observations.

<sup>2</sup>Stanley F. Krause, op. cit.

verification. After the locations were selected and machines placed, one of the owners and a woman experienced in special demonstration visited one thousand homes in each area to inform the residents of the new service offered. Printed explanatory information was distributed which gave the merits of the service and the method of functioning.

During July, August, and September, 1954, a relatively concentrated promotional program was conducted including newspaper advertisements which featured machine locations, radio spot announcements, and a radio advertised gift, "Audie the Cow", for children, if the carton purchased from the machine had a card entitling the gift. One out of each five cartons bore these cards.

#### Initial Findings

One of the co-owners serviced the machines on a 24-hour basis, stocked them with milk purchased at a local dairy, and maintained records of sales. For a period of three weeks, the machine locations, care, service, operation, and use were studied to obtain a working knowledge. From first-hand observations and interviews with owners and location supervisors the following initial findings are listed:

1. Who use the vending machines? It was the intent of this new enterprise to provide a new source from which additional milk can be purchased at convenient locations during day or night. Three specific groups of people are catered to with the outdoor milk vending machine. Couples who work away from home during time of home delivery have indicated the greatest interest in the outdoor milk vender. The second



group are those who have an unexpected additional need for milk and find it convenient to go a short distance to a milk vending machine, particularly after normal store hours. The third group are travelers with children or those who are proceeding on sports outings or picnics. Purchases show that the last group is quite small, particularly during the winter months, but is still important enough to influence location of a vending machine. Some families living or working close to the machine locations are prone to be the best perpetual customers.

2. Why are machines used? Some few individuals discovered shortly after installation that milk was held at a cold temperature in the outdoor vending units. Some commented on a better flavor but this could have been due to the fact that temperature of the machines is held between 35° to 38°F which is not always the case in store or home delivery. The convenience factor was the largest single reason they were used. Some persons believed machines were fully charged or loaded with milk and that it remained there until it was all sold. Price being a factor for machine use has not been tested in this area sufficiently to determine results.

3. What need is satisfied? For those consumers desiring milk after regular store hours, those who do not desire to dress up to go into a store or those who need milk as an only purchase, outdoor milk vending machines satisfy a specific need. One of the most important factors is the knowledge by the potential customer that this dependable service exists at a designated location. To the customers whose low income prevents the purchasing of coupons or those who are not extended credit, the outdoor milk vending service can be of particular value if the machines are conveniently located.

4. When are sales normally made? The majority of sales were made between 5 p.m. and 9 p.m. on Saturday and Sunday according to machine attendants. Sales in the Knoxville area have not reached a sufficient volume to establish this point.<sup>3</sup>

5. Where are machines located? Initial observations indicated a good dispersement of machines, with one exception, but most of the locations were awkward for customers. Two of the locations were on the opposite side of the street for the normal traffic flow away from the city. Convenient parking did not exist at several locations and traffic flow during rush hours made it difficult to get back on the highway. Two locations had such heavy traffic that it was more difficult to get to the machines than to the local stores. In each area, super-markets and neighborhood stores were numerous and little or no advantage existed for the vending machine.

The approach to several units was either muddy or required the purchaser to step in mud to receive the vended milk. Four of the six machines were obscure to the traveler, for the location did not afford the prominence necessary for quick decision turn-off.

6. Care and service of machines. Each machine was kept clean and sufficiently stocked with fresh milk to serve a 24-hour period. The cooling systems were carefully observed so as to insure a cold product at

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<sup>3</sup>Sales of milk through outdoor milk vending in Knoxville has not approached the break-even point, therefore time of sales can only be established on the very low volume which may not hold true if sales were increased to the point of business profitability.

all times. The practice of removing old milk after 48 to 72 hours was strictly adhered to by the local business. The service phone number was posted on each box and immediate service was given. On a number of occasions when malfunction of coin device caused a loss to a customer, the service representative made immediate night trips to the home of the person losing money to make a milk delivery. On other occasions, station attendants made refunds.

7. Costs of locating machines. The investment costs in establishing a business of this type is sizable. The cost of the vending machine is from \$2,700.00 to \$3,500.00 each not including crating or freight. Rolling stock for summer and winter delivery costs as much as \$8000.00 if one refrigerated and one non-refrigerated truck is purchased. An additional cost of approximately \$300.00 per unit is incurred for moving and installation, electric meter deposit, operating permit, insurance, and license. The original investment for six outdoor milk vending machines will cost about \$27,000.00. If the machines and rolling stock are amortized over a 50-month period, the break-even point in unit sales per machine will be high, for the cost of milk, space rental, advertising and cost of personnel must also be included. If a locality has a high sales potential as determined by marketing and distribution research technique, a venture of this nature may prove to be profitable.

These initial observations were made prior to area surveys during direct study of the vending machines. Five units were located at gasoline stations and one was located at a radiator repair shop which maintained normal business hours. Each location received a monthly rent which included

the space occupied and supervision of the machine. A key to the box was not available to the attendant but some assistance was given and change was made when needed.

Observations indicated that attendants at most of the locations were interested in the milk vender and were willing to render the type of service necessary to establish repeating purchases. Excessive blocking or surrounding of machines by cars occurred at four of the locations. This made it very difficult to see the vender and difficult to get to the machine, particularly during rainy weather. The boxes, due to their locations, had the tendency to blend in with their surroundings rather than occupying commanding spots where they could be seen with ease for a block each way.

## CHAPTER IV

### REACTION OF THE KNOXVILLE MARKET TO THE OUTDOOR MILK VENDING MACHINES

#### Population Density, Traffic Flow and Selection of Areas

Study of machine functioning and servicing indicated the need for more detailed investigation of the factors affecting a business of this type. No factor, such as population density, traffic flow, competition, convenience, accessibility, quality of product, or price, is found to be analyzable by itself, but each factor enumerated has a bearing on this problem. Data were secured in order that marketing conditions existing in the Knoxville area might be studied.

Since outdoor milk vending machines should be situated in densely populated areas, a population density map of Knoxville (figure 1) was prepared so that this factor could be evaluated in relation to the problem as a whole. Areas of concentration can be seen, and a study of the city has shown these areas, with one exception, are old and have adequate sales outlets.<sup>1</sup> Patterns of purchasing are well established in these areas and shopping centers have been well located. The population density map does not give any indication of shifting population. Growth of Knoxville population by wards (table II) gives the census figures for 1940 and 1950

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<sup>1</sup>Figure 6 gives the location of stores in and near each area of study.

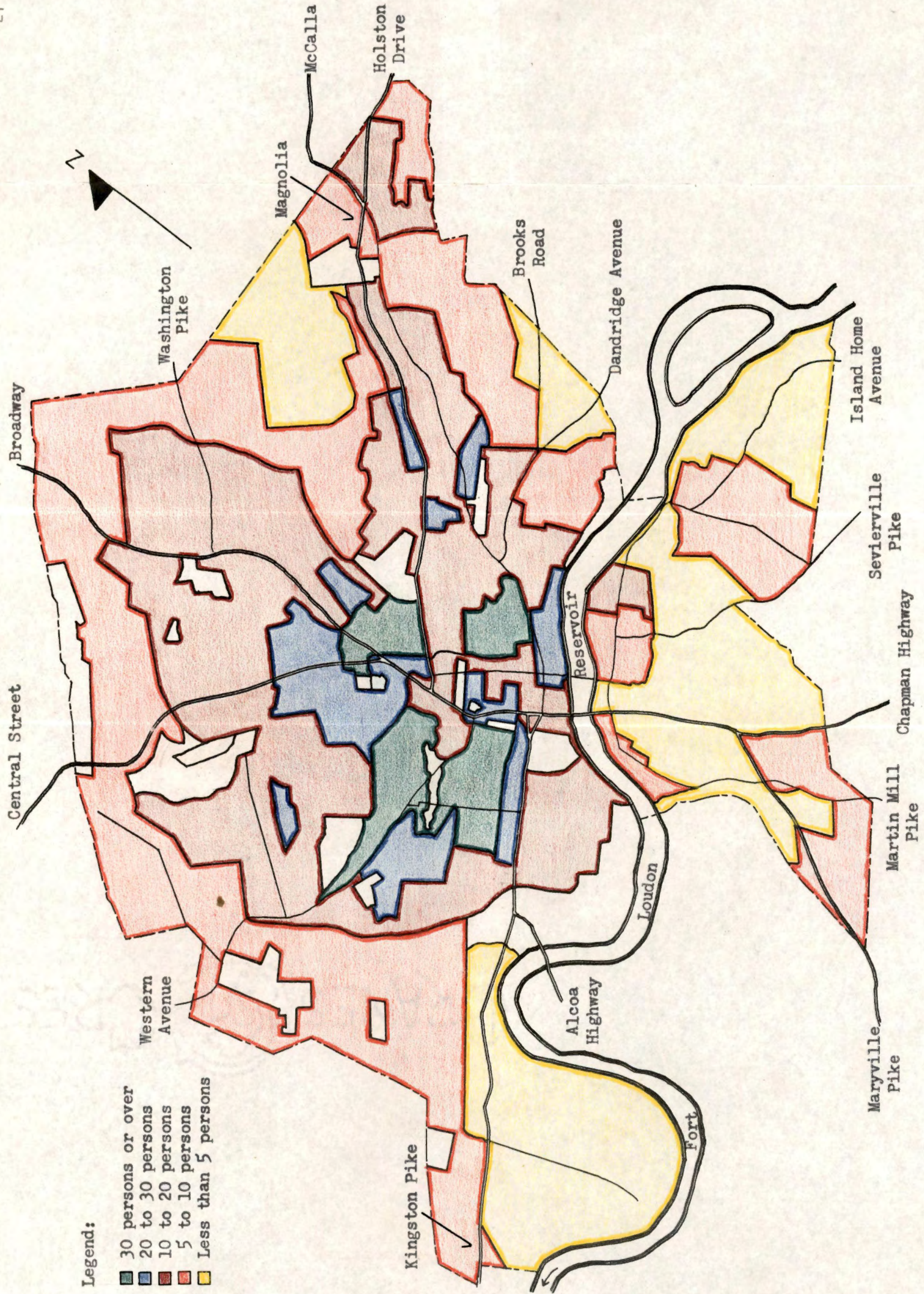


Figure 1. Average population density per acre, Knoxville, Tennessee, 1950.

Source: City Planning Commission, Knoxville, Tennessee

TABLE II

GROWTH OF KNOXVILLE POPULATION BY WARDS, 1940-1950 REVISED<sup>a</sup>

Ward	Area	1940	1950	Change	
				Gain	Loss
1	East Hill	2,678	2,459		219
2	West Main Ave.	1,376	1,323		43
3	East Church Ave.	1,750	1,592		158
4	West Church Ave.	709	355		354
5	Payne Ave.	2,202	2,246	44	
6	Summitt Hill	1,962	1,300		642
7	Luttrell-Sixth Ave.	5,501	4,961		540
8	West Depot Ave.	1,859	1,180		679
9	McAnnally	6,710	5,696		1,014
10	West Knoxville	8,343	10,472	2,129	
11	Old North Knoxville	10,490	9,474		1,016
12	Dandridge-Mountain View	2,943	4,660	1,717	
13	Burlington	3,451	4,480	1,029	
14	Park City (South)	7,858	8,571	713	
15	Park City (North)	7,020	6,989		40
16	North Hills-Walker Blvd.	7,056	9,334	2,278	
17	Oakwood-St. Mary's	5,503	5,638	135	
18	Lincoln Park	3,209	3,693	484	
19	Lonsdale	5,374	5,683	309	
20	Beaumont (North)	3,751	5,422	1,671	
21	Beaumont (South)	2,921	4,110	1,189	
22	Euclid-Proctor	3,782	3,873	91	
23	West Lonsdale	2,311	2,509	198	
24	Sequoyah	3,773	6,933	3,158	
25	Vestal-Chapman Highway	4,205	4,898	693	
26	Sevier Ave.-Island Home	4,842	6,312	1,470	
		111,580	124,183 <sup>b</sup>	12,603 gain	

<sup>a</sup>Source: Chamber of Commerce, Knoxville, Tennessee, February 1955.

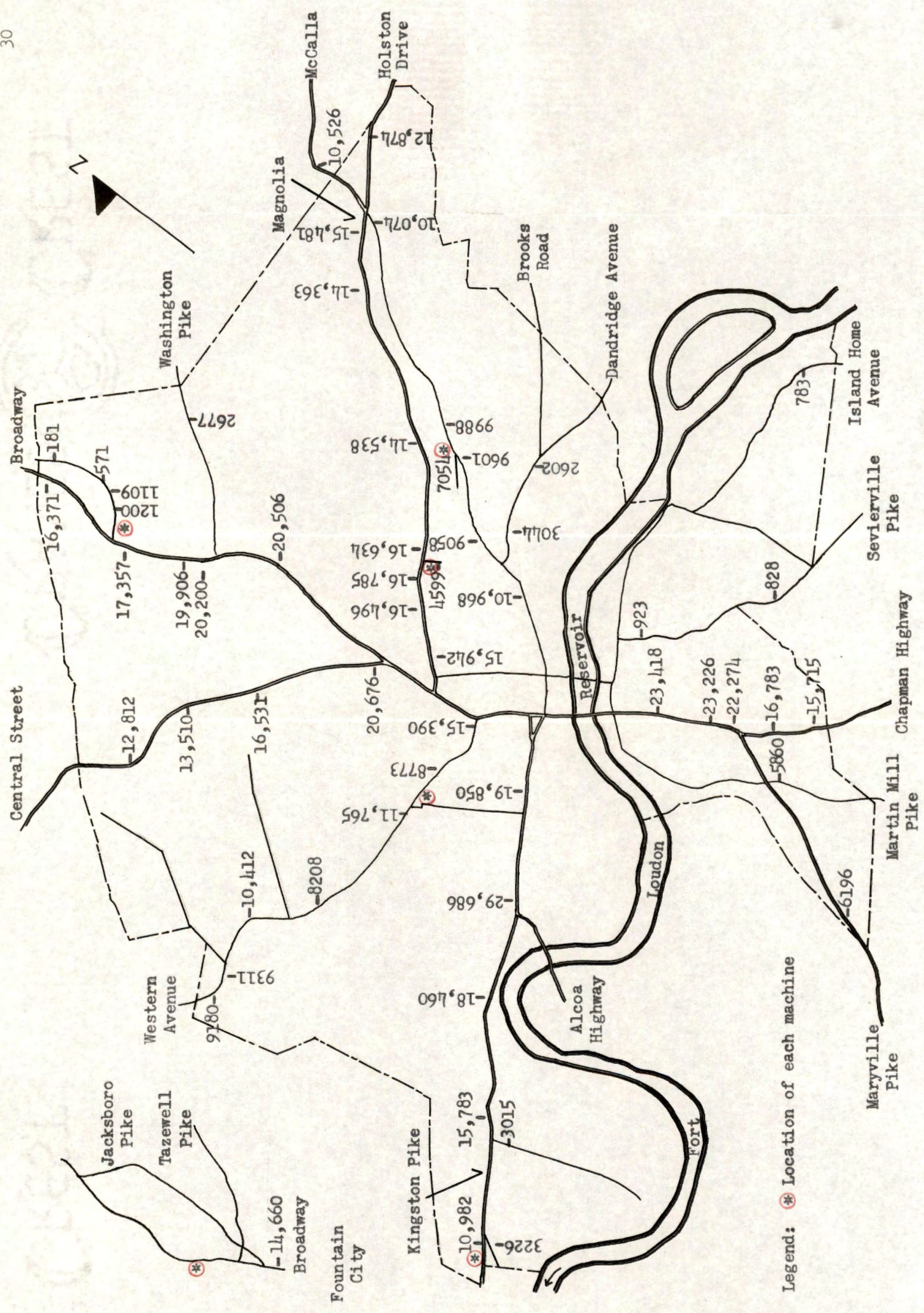
<sup>b</sup>Corrections since made give 1950 population of 124,769.

with gains or losses in each ward. Heavy growth has taken place in West Knoxville and substantial gains in population have been made at the city limits of North Knoxville. The combined use of the population density map and Knoxville ward population has given a better comprehension of densely populated areas and trends in movement. If five thousand were the minimum population which would support a milk vending machine, only 43 percent of Knoxville wards would support a machine; of the 26 wards listed, only 8 percent have had sufficient population increase in the past ten years to exceed five thousand.

Traffic flow is another guide to use in machine location. A traffic count of all Knoxville streets was performed by the Tennessee State Highway Department during May and June, 1954. The map of Knoxville used in this study has traffic flow plotted on some of the major streets (figure 2). These data represent the traffic which passed over each street in an average 24-hour period. Here also, population density was indicated, for reduction of numbers of cars not only revealed the area in which they belong but streets used by families going to and from town. This is an important factor since the majority of outdoor milk vending machines are located at filling stations, thereby catering to those who are driving. The flow of traffic also indicates the number of families who live outside the city limits but drive into town daily. This group should be considered when locating units.

The six machines of this study are plotted by number on the standard size map for easy comparison (figure 3). The circles which encompass each machine represent the approximate area which it serves and will be referred





Legend: \* Location of each machine

Figure 2. Pattern of traffic flow during 24-hour period for Knoxville, Tennessee, 1954.

Source: Tennessee Department of Highways and Public Works, Nashville, Tennessee

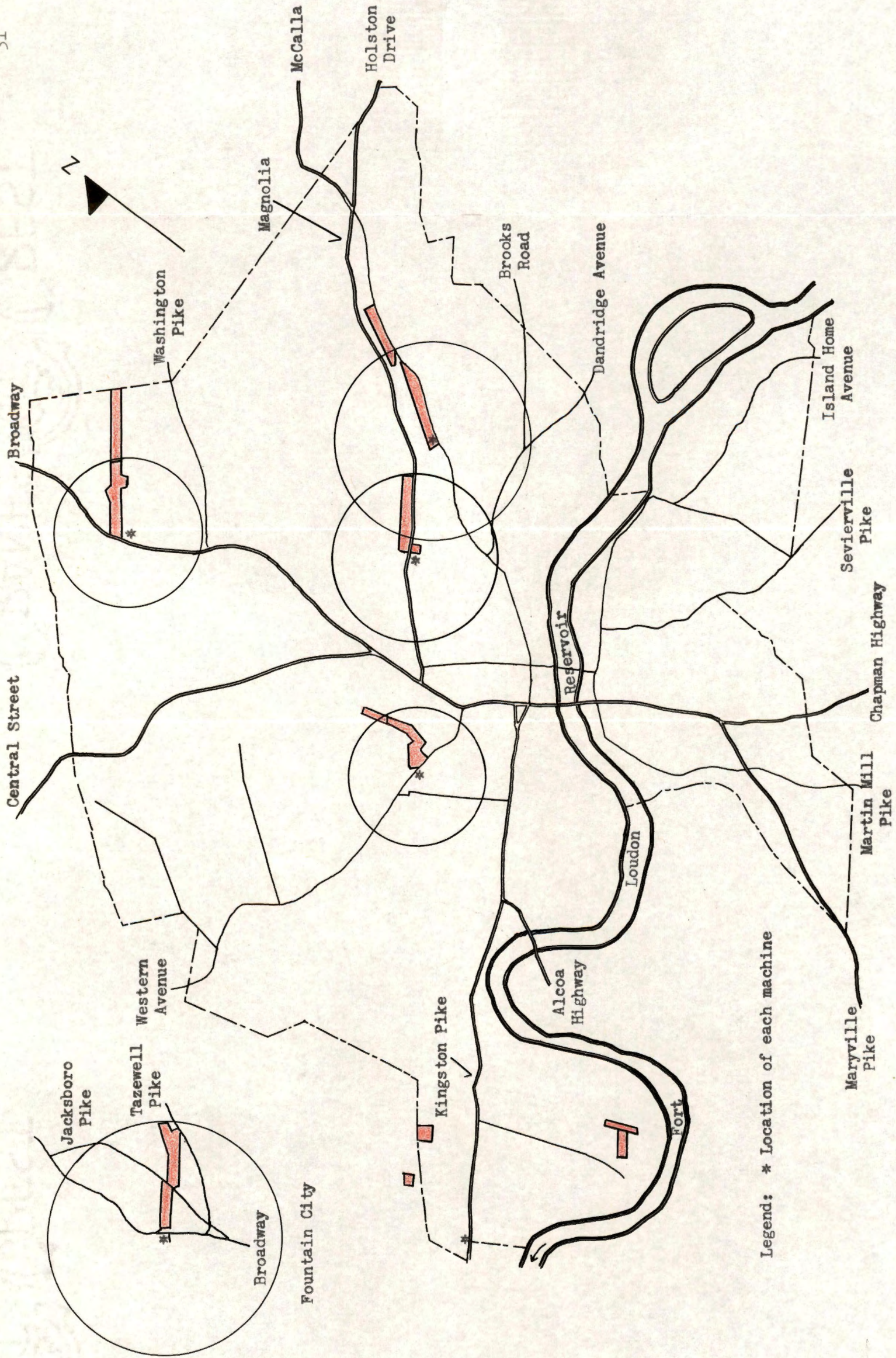


Figure 3. Location of milk vending machines, areas served, and sectors of survey, Knoxville, Tennessee, 1954-1955.

to as area number one through six, depending upon the machine in question. The shaded portion of each area represents the selected blocks for survey. Where possible, sectors were selected which ran in an easterly direction for a mile from the milk vending machine which was located at the center of each area. Such is the case with areas one through four. Area five required a shift to the north, due to construction. Area six is composed of four separate areas in the fastest growing section of Knoxville and also reflects a wide range of family incomes. The selected sectors for house-to-house survey composed the radius of each area, and were about one block wide. Every dwelling falling into these sectors was visited to obtain data.

Two types of surveys were conducted. The first was directed at the present customers and was accomplished by attaching a self-addressed questionnaire to each unit of milk vended through each machine. The second was a house-to-house visit in the selected sectors of each area. The area survey questions were phrased to determine from what source the family purchased milk, how many quarts per week, what price paid, and if they had bought milk from an outdoor vending machine. A sample copy of the area questionnaire can be found in Appendix B.

The survey directed at those buying milk through the machines produced a 6 percent return and no individual complied more than once. The rate of return was actually greater than 6 percent since a number of customers received several cards, for they purchased milk often during the period of the survey. The response gained from this portion of the survey has been completely documented (appendix C). Many of the comments contribute to a better insight of customer understanding of the service.

The majority of the buying habits correspond with those of the house-to-house survey. Fifty-two percent of those replying were not aware that the milk they had purchased through the vending machine was cheaper than other sources for the same quality product. Fifty-two percent received their normal supply of milk through home delivery and 62-1/2 percent made purchases at night. With the exception of those who purchased daily or several times a week, the majority bought milk through the machines on Sunday.

#### Survey Results, Area One

This sector of seven blocks represented 159 families from which 137 schedules were completed. Sixty-two percent of the families had heard of the outdoor milk vending machines but only 12 percent had made purchases (table III). The three blocks closest to the machine had the largest participation, with the block nearest the machine having 30 percent of the families using the outlet once or more. Of the 14 families in the sector using the milk vending machine, only four used it more than once a month. Fifty-three percent of the families in the sector of area one had their milk delivered at home; 39 percent purchased their supply at the store; 2 percent obtained milk from other sources such as their farm, a friend, their own cow, or a milk vending machine; and 6 percent of the families did not purchase milk. The consumers preferred homogenized milk almost two to one. In this area, the daily average consumption per family the week previous to the study was 1.07 quarts per day. The data of Table III summarizes questionnaire comments in reference to milk vending machines.

TABLE III

SUMMARY OF SURVEY DATA FOR MACHINE NO. 1<sup>a</sup>

Question	Block						Total	
	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6		
1. (a) Milk purchased from route delivery	8	11	13	9	13	13	8	75
(b) Milk purchased from store	1	11	10	2	9	11	9	53
(c) Milk purchased from other sources	1	1	0	0	1	0	0	3
2. (a) Homogenized milk bought in quart equivalents last week	85	117	106	63	105	136	70	682
(b) Regular milk bought in quart equivalents last week	65	30	53	23	79	30	71	351
3. (a) Price paid for homogenized milk								
(b) Price paid for regular milk								
4. Have you bought from a milk vending machine? Yes	3	4	4	0	2	1	0	14
No	7	19	20	12	17	24	16	114
5. Have you heard of milk vending machines? Yes	6	14	16	9	11	17	12	85
No	1	4	4	3	7	7	2	28
(a) Don't recall	0	2	1	1	2	3	1	10
By reading paper or magazines	1	1	1	1	0	0	0	4
Listening to radio or TV	0	0	1	0	1	2	1	5
First heard from a friend	0	0	1	0	1	2	1	6
Saw a Wolfe vending machine	0	0	2	1	0	1	2	6
Saw an Automatic Dairies vending machine	0	0	1	0	0	2	1	4
(b) Have you heard anyone speak of them? Yes	5	10	12	6	9	6	8	56
No	0	4	3	1	3	3	5	19
(c) Good for those who use large or small amount of milk	5	8	8	7	8	9	5	50
Good for those with small children	1	2	5	4	1	1	1	15
Good for those traveling with children	0	0	1	0	0	0	0	1
Good for outings and picnics or those with cars	1	4	1	2	1	1	2	12
Question product or undecided	1	1	1	0	0	0	0	3
Fine for purchase if stores are closed or extra milk is needed	0	0	0	1	0	1	0	2
	3	7	7	1	6	8	4	36

TABLE III

SUMMARY OF SURVEY DATA FOR MACHINE NO. 1<sup>a</sup> (CONTINUED)

Question	Block							Total
	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	
5. (c) O. K. for conveniently located or those who don't buy regularly	0	0	1	0	3	2	4	10
(d) Have tried but machine did not work	0	0	0	0	0	0	0	0
Good if price were lower	0	0	0	0	0	0	0	0
Not interested, does not appeal to me	0	0	0	0	0	1	0	1
Do not change milk for children	0	0	1	0	0	0	0	1
Get enough milk from store	0	0	0	0	1	0	2	3
Have had no need for extra milk	1	2	2	0	0	2	0	7
Store is more convenient	0	8	7	2	6	7	5	35
Dairy delivery is more convenient	4	5	5	6	2	4	3	29
Machines are not convenient	1	0	0	1	0	1	0	3
(e) Do you have need for extra milk in a hurry? Yes	0	1	2	1	2	4	1	11
No	1	4	1	2	6	5	3	22
(f) Would you purchase milk from vending machines if they were located conveniently? Yes	0	1	1	2	3	3	1	11
No	1	4	2	1	5	6	3	22
6. (a) Purchase from which machine	3#1	3#1	3#1	0	2#1	1#1	0	12#1
			1#3					1#3
			1#4					1#4
(b) Yesterday	1	0	0	0	0	0	0	1
Last week	1	1	1	0	1	0	0	4
Last month	0	1	1	0	0	1	0	3
Several months ago	1	1	2	0	1	0	0	5
Every day	1	0	0	0	0	0	0	1
Week ends only	1	0	0	0	1	0	0	2
Several times a week	0	1	0	0	0	0	0	1
Several times a month	0	0	1	0	0	0	0	1

TABIE III

SUMMARY OF SURVEY DATA FOR MACHINE NO. 1<sup>a</sup> (CONTINUED)

Question	Block							Total
	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	
6. (c) Occasionally	0	1	2	0	1	1	0	5
Rarely	0	0	1	0	0	0	0	1
(d) Purchased during morning	1	0	0	0	0	1	0	2
afternoon	2	0	1	0	0	0	0	3
evening	2	3	3	0	2	0	0	10
(e) Do special occasions increase your need for milk?	1	3	3	0	1	1	0	9
Yes	2	0	1	0	1	0	0	4
No	0	0	0	0	0	0	0	0
7. Vending machines are of no interest to me	0	0	0	0	0	0	0	0
Good thing, might try them	0	0	0	0	0	0	0	0
Buy milk only in bottles; do not use cartons	0	0	2	0	0	0	0	2
Buy at local store; not aware of vending machines	0	0	0	1	1	0	0	2
Rather have quarts than 1/2 gallons	0	0	0	0	0	0	0	0
Powdered milk used for drinking	0	0	0	0	0	0	0	0
Machines are convenient while driving or returning from work	0	0	0	0	0	0	0	0
Lowering price would influence my trade	0	0	0	0	0	0	0	0
Change is a problem	0	1	0	0	0	0	0	1
O. K. as is	2	2	4	0	1	0	0	9
Machine should be more easily recognized	0	0	0	0	0	0	0	0
Could be more conveniently located	0	0	0	0	0	0	0	0

<sup>a</sup>Some interviewees gave two answers for several questions, others gave no answers for a question thereby causing figures within columns to disagree with totals. Grand totals were obtained by taking first answers only.

### Survey Results, Area Two

This sector of five complete blocks represented 162 families from which 145 schedules were completed. Fifty percent of the families had heard of the outdoor milk vending machine but only 12 percent had made purchases (table IV). The three blocks closest to the machine had the largest participation, with the second block having 32 percent of the families using the outlet once or more. Of the 18 families using the milk vending machine in this sector of the area, one family purchased milk every day, three families on week ends only, and three families several times a week. Forty-eight percent of the families had their milk delivered at home; 43 percent purchased their supply at the store; 4 percent obtained milk from other sources; and 5 percent of the families did not purchase milk. Homogenized milk was preferred at a two to one ratio. The daily average consumption per family the week previous to the survey was 0.9 quart. The sector reaction to outdoor milk vending machines is summarized in Table IV. Area two included a large number of apartment or multiple dwellings which housed working couples and unmarried employees. The area was adjacent to several large shopping centers.

### Survey Results, Area Three

This sector passed through an old, well-developed residential area which covered a wide range of family incomes. As in all the areas, shopping centers and neighborhood stores were well distributed. The sector, consisting of five complete blocks, represented 124 families from which 107 schedules were completed. Sixty-one percent of the families had



TABLE IV

SUMMARY OF SURVEY DATA FOR MACHINE NO. 2<sup>a</sup>

Question	Block					Total
	No. 1	No. 2	No. 3	No. 4	No. 5	
1. (a) Milk purchased from route delivery	16	10	8	10	28	73
(b) Milk purchased from store	5	8	12	19	21	65
(c) Milk purchased from other sources	1	2	1	1	1	6
2. (a) Homogenized milk bought in quart equivalents last week	102	90	77	92	229	596
(b) Regular milk bought in quart equivalents last week	45	34	21	39	163	302
3. (a) Price paid for homogenized milk						
(b) Price paid for regular milk						
4. Have you bought from a milk vending machine? Yes	4	6	4	2	2	18
No	16	13	15	25	47	116
5. Have you heard of milk vending machines? Yes	14	0	11	13	27	73
No	2	3	5	12	22	44
(a) Don't recall	0	0	2	4	3	9
By reading paper or magazines	0	1	2	2	5	10
Listening to radio or TV	0	1	0	1	1	3
First heard from a friend	2	0	0	2	4	8
Saw a Wolfe vending machine	0	0	0	0	1	3
Saw an Automatic Dairies vending machine	9	9	5	7	10	40
(b) Have you heard anyone speak of them? Yes	7	1	3	7	9	23
No	5	7	7	7	14	40
(c) Good for those who use large or small amount of milk	1	1	3	1	3	9
Good for those with small children	0	0	1	0	1	2
Good for those traveling with children	6	1	0	3	5	15
Good for outings and picnics or those with cars	0	0	1	1	2	4
Question product or undecided	0	0	0	0	1	1
Fine for purchase if stores are closed or extra milk is needed	5	5	1	2	4	17

TABLE IV

SUMMARY OF SURVEY DATA FOR MACHINE NO. 2<sup>a</sup> (CONTINUED)

Question	Flock					Total
	No. 1	No. 2	No. 3	No. 4	No. 5	
5. (c) O. K. for conveniently located or those who don't buy regularly	0	2	1	2	3	8
(d) Have tried but machine did not work	0	0	0	0	0	0
Good if price were lower	0	0	0	0	0	0
Not interested, does not appeal to me	0	0	0	0	2	2
Do not change milk for children	0	0	0	0	0	0
Get enough milk from store	1	1	0	1	0	3
Have had no need for extra milk	4	5	1	1	0	16
Store is more convenient	0	3	1	11	5	22
Dairy delivery is more convenient	3	0	5	2	7	17
Machines are not convenient	2	1	1	1	4	9
(e) Do you have need for extra milk in a hurry?	0	0	2	3	13	18
Yes	2	3	4	7	11	27
No	0	0	3	1	9	13
(f) Would you purchase milk from vending machines if they were located conveniently?	2	3	3	1	15	27
Purchase from which machine	5#2	6#2	2#2	2#2	1 Wolf	32
			1 Wolf			
			1#3			
(b) Yesterday	0	0	0	0	0	0
Last week	0	3	1	1	0	5
Last month	2	1	1	1	0	5
Several months ago	1	1	2	1	1	6
(c) Every day	0	1	0	0	0	1
Week ends only	1	1	0	1	0	3
Several times a week	1	1	1	0	0	3

TABIE IV

SUMMARY OF SURVEY DATA FOR MACHINE NO. 2<sup>a</sup> (CONTINUED)

Question	Block					Total
	No. 1	No. 2	No. 3	No. 4	No. 5	
6. (c) Several times a month Occasionally Rarely	0	0	0	0	0	0
(d) Purchased during morning afternoon evening	0	2	1	0	0	3
(e) Do special occasions increase your need for milk?	2	1	1	0	1	5
Yes	2	0	0	0	1	3
No	3	5	3	3	2	16
7. Vending machines are of no interest to me	2	1	1	1	0	5
Good thing, might try them	0	0	0	0	0	0
Buy milk only in bottles; do not use cartons	0	1	2	0	0	3
Buy at local store; not aware of vending machines	0	2	0	0	0	2
Rather have quarts than 1/2 gallons	0	0	0	0	0	0
Powdered milk used for drinking	1	0	1	0	0	2
Machines are convenient while driving or returning from work	0	0	1	0	0	1
Lowering price would influence my trade	0	0	2	1	0	3
Change is a problem	0	0	1	1	0	2
O. K. as is	3	3	2	1	2	11
Machine should be more easily recognized	0	0	0	0	0	0
Could be more conveniently located	0	0	0	0	0	0
Don't know how to use the machine	0	0	0	0	0	0
Better than dishonest milk man	0	0	1	0	0	1

<sup>a</sup>Some interviewees gave two answers for several questions, others gave no answers for a question thereby causing figures within columns to disagree with totals. Grand totals were obtained by taking first answers only.

heard of the outdoor milk vending machines but only 27 percent had made purchases (table V). Purchases, per family, from the vending machine in the sector varied considerably. Beginning at the machine, the percentages of the five blocks were 38 percent, 43 percent, 17 percent, 35 percent, and 8 percent. Location apparently had little to do with percentage of family participation in this sector. Of the 29 families using the machine, only four used it every day, five used it on week ends, and four report they used it several times a week. Eighty-one percent of the families had their milk delivered at home; 14 percent purchased their milk at the store; 2 percent obtained milk from other sources; and 3 percent of the families used no milk. Here, also, homogenized milk was purchased at almost a two to one ratio. The daily average consumption of milk per family during the week prior to the survey was 1.4 quarts. The area reaction to outdoor milk vending machines is summarized in Table V.

#### Survey Results, Area Four

Sector four, located in Fountain City, consisted of five complete blocks. Due to street arrangement, depth of area exceeded one block in several places. The homes in the third and fourth blocks were larger and occupied more space, thereby reducing the total number per block. This sector represented 124 families from which 111 schedules were completed. Fifty-four percent of the families had heard of the outdoor milk vending machines but only 15 percent had made purchases (table VI). Families of the first two blocks purchased milk from the vending machine at the rate of 30 and 33 percent, respectively, followed by percentages of 13, 17 and 4.

TABLE V

SUMMARY OF SURVEY DATA FOR MACHINE NO. 3<sup>a</sup>

Question	Block					Total
	No. 1	No. 2	No. 3	No. 4	No. 5	
1. (a) Milk purchased from route delivery	20	16	12	33	13	94
(b) Milk purchased from store	5	1	4	7	1	18
(c) Milk purchased from other sources	0	1	0	1	0	2
2. (a) Homogenized milk bought in quart equivalents last week	157	69	83	262	89	660
(b) Regular milk bought in quart equivalents last week	72	114	20	111	58	375
3. (a) Price paid for homogenized milk						
(b) Price paid for regular milk						
4. Have you bought from a milk vending machine? Yes	9	7	2	10	1	29
No	15	9	12	29	12	79
5. Have you heard of milk vending machines? Yes	12	6	11	27	9	65
No	4	2	1	2	3	12
(a) Don't recall	0	0	0	0	0	0
By reading paper or magazines	0	0	1	2	0	3
Listening to radio or TV	0	0	0	1	0	1
First heard from a friend	1	1	0	3	0	5
Saw a Wolfe vending machine	6	2	1	9	0	24
Saw an Automatic Dairies vending machine	8	3	9	14	4	38
(b) Have you heard anyone speak of them? Yes	5	2	6	15	1	19
No	7	4	4	15	8	38
(c) Good for those who use large or small amount of milk	5	3	6	8	1	23
Good for those with small children	0	0	0	0	0	0
Good for those traveling with children	0	1	0	1	1	3
Good for outings and picnics or those with cars	0	1	0	2	1	4
Question product or undecided	0	0	1	2	0	3
Fine for purchase if stores are closed or extra milk is needed	4	2	2	5	3	16

TABLE V

SUMMARY OF SURVEY DATA FOR MACHINE NO. 3<sup>a</sup> (CONTINUED)

Question	Block					Total
	No. 1	No. 2	No. 3	No. 4	No. 5	
5. (c) O. K. for conveniently located or those who don't buy regularly	0	0	1	1	1	4
(d) Have tried but machine did not work	0	1	0	0	0	1
Good if price were lower	1	0	0	0	0	1
Not interested, does not appeal to me	2	0	0	0	1	3
Do not change milk for children	0	0	0	0	0	0
Get enough milk from store	0	1	0	0	1	2
Have had no need for extra milk	3	0	6	11	3	23
Store is more convenient	5	4	3	10	3	25
Dairy delivery is more convenient	3	0	0	2	1	6
Machines are not convenient	0	1	0	1	0	2
(e) Do you have need for extra milk in a hurry? Yes	3	0	0	3	1	7
No	1	2	1	1	2	7
(f) Would you purchase milk from vending machines if they were located conveniently? Yes	2	0	1	1	0	4
No	2	1	0	3	3	9
6. (a) Purchase from which machine	9#3	6#3	1#4	4#3	1#2	21#3
	2 Wolves	1 Wolfe	1#3	5 Wolves	8 Wolves	
(b) Yesterday	0	0	1	0	1	2
Last week	0	0	0	0	1	1
Last month	0	0	1	0	0	1
Several months ago	0	0	0	0	0	0
(c) Every day	2	1	0	1	0	4
Week ends only	2	2	0	1	0	5
Several times a month	2	1	1	0	0	4

TABLE V

SUMMARY OF SURVEY DATA FOR MACHINE NO. 3<sup>a</sup> (CONTINUED)

Question	Block					Total
	No. 1	No. 2	No. 3	No. 4	No. 5	
6. (c) Occasionally	3	1	0	9	1	14
Rarely	4	2	1	9	1	17
(d) Purchased during morning	0	0	0	1	0	1
afternoon	0	1	0	5	0	6
evening	8	5	2	5	0	20
(e) Do special occasions increase your need for milk? Yes	6	3	1	5	0	15
No	3	3	1	5	1	13
7. Vending machines are of no interest to me	0	0	0	0	0	0
Good thing, might try them	0	0	1	0	0	1
Buy milk only in bottles; do not use cartons	0	0	0	0	1	1
Buy at local store; not aware of vending machines	0	0	0	0	0	0
Rather have quarts than 1/2 gallons	0	1	0	1	0	2
Powdered milk used for drinking	0	0	1	0	0	1
Machines are convenient while driving or returning from work	0	0	0	0	0	0
Lowering price would influence my trade	1	0	0	0	0	1
Change is a problem	2	1	0	1	0	4
O. K. as is	7	3	2	8	1	21
Machine should be more easily recognized	0	0	0	0	0	0
Could be more conveniently located	0	0	0	0	0	0
Cas Walker	0	0	1	1	0	2

<sup>a</sup>Some interviewees gave two answers for several questions, others gave no answers for a question thereby causing figures within columns to disagree with totals. Grand totals were obtained by taking first answers only.

TABLE VI

SUMMARY OF SURVEY DATA FOR MACHINE NO. 4<sup>a</sup>

Question	Block					Total
	No. 1	No. 2	No. 3	No. 4	No. 5	
1. (a) Milk purchased from route delivery	16	27	5	8	24	80
(b) Milk purchased from store	2	9	4	7	4	26
(c) Milk purchased from other sources	0	1	0	1	1	3
2. (a) Homogenized milk bought in quart equivalents last week	90	200	36	99	131	556
(b) Regular milk bought in quart equivalents last week	29	60	8	60	88	246
3. (a) Price paid for homogenized milk						
(b) Price paid for regular milk						
4. Have you bought from a milk vending machine? Yes	4	9	1	2	1	17
No	13	27	8	12	25	87
5. Have you heard of milk vending machines? Yes	9	17	6	10	18	60
No	4	9	2	2	9	26
(a) Don't recall	0	2	0	1	1	4
By reading paper or magazines	0	2	0	0	0	2
Listening to radio or TV	0	1	0	0	0	1
First heard from a friend	2	0	0	1	2	5
Saw a Wolfe vending machine	0	0	0	0	3	3
Saw an Automatic Dairies vending machine	8	16	6	8	15	53
(b) Have you heard anyone speak of them? Yes	3	7	1	0	1	12
No	0	1	0	2	0	3
(c) Good for those who use large or small amount of milk	4	8	1	6	10	29
Good for those with small children	2	3	3	3	3	14
Good for those traveling with children	0	0	0	0	0	0
Good for outings and picnics or those with cars	0	7	2	4	2	15
Question product or undecided	1	1	0	2	0	4
Fine for purchase if stores are closed or extra milk is needed	2	4	1	1	5	13





TABLE VI

SUMMARY OF SURVEY DATA FOR MACHINE NO. 4<sup>a</sup> (CONTINUED)

Question	Block					Total
	No. 1	No. 2	No. 3	No. 4	No. 5	
6. (c) Occasionally	1	3	1	0	0	4
Rarely	2	1	0	1	1	5
(d) Purchased during morning	0	0	0	0	0	0
afternoon	4	4	0	0	0	8
evening	0	5	1	2	1	9
(e) Do special occasions increase your need for milk? Yes	3	7	1	0	1	12
No	0	1	0	2	0	3
7. Vending machines are of no interest to me	2	0	0	0	1	3
Good thing, might try them	1	0	0	0	2	3
Buy milk only in bottles; do not use cartons	0	0	0	0	0	0
Buy at local store; not aware of vending machines	1	0	0	0	1	2
Rather have quarts than 1/2 gallons	0	0	0	1	0	1
Powdered milk used for drinking	1	3	0	1	1	6
Machines are convenient while driving or returning from work	0	1	0	0	0	1
Lowering price would influence my trade	3	1	0	0	1	5
Change is a problem	0	3	0	0	1	4
O. K. as is	2	4	1	0	0	7
Machine should be more easily recognized	0	1	0	0	0	1
Could be more conveniently located	0	1	0	0	0	1

<sup>a</sup>Some interviewees gave two answers for several questions, others gave no answers for a question thereby causing figures within columns to disagree with totals. Grand totals were obtained by taking first answers only.

Travel routes by families partially explain the spread. This vender has had the best sustained sales of the group. The same purchasing pattern occurs in this area as was found in those previously mentioned. Seventy-one percent of the families had milk delivered at home; 23 percent purchased milk at the store; 3 percent purchased milk from other sources; and 3 percent of the families used no milk. Preference for homogenized milk exceeded the two to one ratio. The daily average consumption of milk per family during the previous week was 1.03 quarts. The area reaction to outdoor milk vending machines is summarized in Table VI.

#### Survey Results, Area Five

Bordering the most densely populated area in the city, this area included low-income groups and was the smallest area of the study, but the most heavily populated. Buying habits were unlike other areas of the study and the people appeared to have the same standard of living whereas the other areas included a range. The blocks were small, some with stores or a school, and it was necessary to cover nine blocks to extend a mile from the vending machine. This area represented 180 families from which 161 schedules were completed. Fifty-nine percent of the families had heard of the outdoor milk vending machines but only 13 percent had made purchases (table VII). There seemed to be no pattern in percent purchases by block as distance increased from the machine. The source of purchase changed as only 25 percent of the families had milk delivered at home; 64 percent purchased milk at the store; 5 percent purchased milk from other sources; and 6 percent of the families used no milk. Only a

TABLE VII

SUMMARY OF SURVEY DATA FOR MACHINE NO. 5<sup>a</sup>

Question	Block									Total
	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9	
1. (a) Milk purchased from route delivery	8	0	4	6	3	4	4	6	5	40
(b) Milk purchased from store	15	8	9	8	11	9	20	15	11	106
(c) Milk purchased from other sources	0	0	1	1	0	0	4	0	1	7
2. (a) Homogenized milk bought in quart equivalents last week	127	19	61	43	135	46	96	75	54	675
(b) Regular milk bought in quart equivalents last week	64	21	36	75	76	60	165	74	64	635
3. (a) Price paid for homogenized milk										
(b) Price paid for regular milk										
4. Have you bought from a milk vending machine? Yes	4	2	2	4	3	0	3	1	2	21
No	20	6	12	10	11	13	24	20	14	130
5. Have you heard of milk vending machines? Yes	20	5	11	10	7	6	15	12	9	95
No	0	1	1	0	3	5	8	8	5	31
(a) Don't recall	0	0	0	1	0	0	2	3	4	10
By reading paper or magazines	0	0	1	0	0	0	1	1	2	5
Listening to radio or TV	0	0	0	1	0	0	0	1	0	2
First heard from a friend	0	0	0	1	1	3	1	0	1	7
Saw a Wolfe vending machine	0	0	0	0	1	0	1	1	0	3
Saw an Automatic Dairies vending machine	20	5	10	7	7	5	10	7	3	74
(b) Have you heard anyone speak of them? Yes	5	3	2	5	1	4	3	4	2	29
No	13	1	9	3	3	3	1	8	7	58
(c) Good for those who use large or small amount of milk	7	0	0	1	1	1	1	2	1	14
Good for those with small children	0	1	1	0	0	0	0	0	0	2
Good for those traveling with children	2	0	0	0	0	0	1	2	1	6
Good for outings and picnics or those with cars	2	0	0	0	0	0	1	2	1	6

TABLE VII

SUMMARY OF SURVEY DATA FOR MACHINE NO. 5<sup>a</sup> (CONTINUED)

Question	Block										Total	
	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9	No.		
5. (e) Question product or undecided Fine for purchase if stores are closed or extra milk is needed	0	0	3	0	0	0	0	0	0	0	0	3
O. K. for conveniently located or those who don't buy regularly	8	3	6	5	5	6	3	5	1			52
(d) Have tried but machine did not work Good if prices were lower	0	1	0	2	1	0	1	2	1			8
Not interested, does not appeal to me	0	0	0	0	0	0	0	0	0			0
Do not change milk for children	0	0	0	0	0	0	0	0	0			0
Get enough milk from store	1	0	0	0	0	0	0	0	0			1
Have had no need for extra milk	0	0	0	0	0	0	1	0	0			1
Store is more convenient	1	0	0	0	0	0	1	0	0			2
Dairy delivery is more convenient	9	6	8	6	6	7	8	8	5			63
Machines are not convenient	6	0	1	3	1	1	0	5	3			20
(e) Do you have need for extra milk in a hurry?	0	0	0	1	1	0	6	0	1			9
Yes	0	0	1	0	1	2	1	2	2			9
No	0	1	0	0	2	2	7	5	2			19
(f) Would you purchase milk from vending machines if they were located conveniently? Yes	0	0	0	0	0	4	1	0	2			7
No	0	1	1	0	3	1	7	7	2			22
6. (a) Purchase from which machine	3/5	2/5	1/5	3/5	2/5	0	2/5	1/6	2/5			15/5
1 Broad-acre												1/4
1 Broad-acre												1
1 Wolfe												1
1/2												1/2
1/6												1/6



TABLE VII

SUMMARY OF SURVEY DATA FOR MACHINE NO. 5<sup>a</sup> (CONTINUED)

Question	Block									Total	
	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9		
7. Machines are convenient while driving or returning from work	0	0	0	0	0	0	0	0	0	0	0
Lowering price would influence my trade	0	0	0	0	0	0	0	0	0	0	0
Change is a problem	0	0	0	1	0	0	0	0	0	0	1
O. K. as is	4	1	2	3	3	0	3	0	2	19	19
Machine should be more easily recognized	0	0	0	0	0	0	0	0	0	0	0
Could be more conveniently located	0	1	0	0	0	0	0	0	1	0	2

<sup>a</sup>Some interviewees gave two answers for several questions, others gave no answers for a question thereby causing figures within columns to disagree with totals. Grand totals were obtained by taking first answers only.

very slight preference existed for homogenized milk. The daily average consumption of milk per family during the previous week was 1.2 quarts. Their reaction to outdoor milk vending machines has been summarized in Table VII.

#### Survey Results, Area Six

As mentioned in the first of the chapter, this area departs from the pattern established in the city survey since no residential section existed in sufficient size within a mile in an easterly direction. Machines were on location before the study began, therefore, all general survey areas were set. In area six, four sectors were selected in different income groups. The first was in Sutherland Village, a University of Tennessee student family housing area; the second was a unit of Forest Hills Apartments; the third was a two-square-block area in Sequoyah Hills; and the fourth was a section off Weisgarber Road in Bearden. These sectors represented 125 families from which 109 schedules were completed. Fifty-three percent of the families had heard of the outdoor milk vending machines but only 18 percent had made purchases (table VIII). Purchasing percentages in the four sections were: Sutherland Village 11 percent, Forest Hills Apartments 15 percent, Sequoyah Hills 18 percent, and Weisgarber section 27 percent. The two most distant sectors, Sequoyah and Weisgarber, were the best customers. Seventy-three percent of the families had milk delivered at home; 21 percent purchased milk at the store; 4 percent purchased milk from other sources; and 2 percent of the families used no milk. Preference for homogenized milk exceeded the ratio of 2-1/2 to one.



TABLE VIII

SUMMARY OF SURVEY DATA FOR MACHINE NO. 6<sup>a</sup>

Question	Block				Total
	No. 1	No. 2	No. 3	No. 4	
1. (a) Milk purchased from route delivery	16	9	29	27	81
(b) Milk purchased from store	5	8	1	9	23
(c) Milk purchased from other sources	0	3	1	0	4
2. (a) Homogenized milk bought in quart equivalents last week	147	138	204	262	751
(b) Regular milk bought in quart equivalents last week	88	27	150	30	295
3. (a) Price paid for homogenized milk					
(b) Price paid for regular milk					
4. Have you bought from a milk vending machine? Yes	2	3	6	9	20
No	17	17	27	25	86
5. Have you heard of milk vending machines? Yes	15	6	17	20	58
No	2	6	9	6	23
(a) Don't recall	3	3	0	4	10
By reading paper or magazines	1	0	0	2	3
Listening to radio or TV	0	0	1	2	3
First heard from a friend	0	2	1	1	4
Saw a Wolfe vending machine	0	2	1	0	3
Saw an Automatic Dairies vending machine	12	4	12	13	41
(b) Have you heard anyone speak of them? Yes	5	3	4	6	18
No	10	5	9	12	36
(c) Good for those who use large or small amount of milk	0	0	2	0	2
Good for those with small children	0	1	1	0	2
Good for those traveling with children	5	2	4	1	12
Good for outings and picnics or those with cars	2	1	1	0	4
Question product or undecided	0	0	0	0	0
Fine for purchase if stores are closed or extra milk is needed	5	3	7	14	29

TABLE VIII

SUMMARY OF SURVEY DATA FOR MACHINE NO. 6<sup>a</sup> (CONTINUED)

Question	Block				Total
	No. 1	No. 2	No. 3	No. 4	
5. (c) O. K. for conveniently located or those who don't buy regularly	4	4	0	3	11
(d) Have tried but machine did not work	0	0	0	0	0
Good if price were lower	0	0	0	0	0
Not interested, does not appeal to me	0	0	1	1	2
Do not change milk for children	0	0	0	0	0
Get enough milk from store	3	0	4	0	7
Have had no need for extra milk	2	4	2	1	9
Store is more convenient	4	2	6	4	15
Dairy delivery is more convenient	6	3	4	13	26
Machines are not convenient	1	1	0	1	3
(e) Do you have need for extra milk in a hurry? Yes	2	1	8	3	14
No	0	1	3	2	10
(f) Would you purchase milk from vending machines Yes	2	1	5	5	13
No	0	1	6	0	11
6. (a) Purchase from which machine	#6	2#6	3#6	6	6#6
(b) Yesterday	0	0	0	1	1
Last week	0	1	1	0	2
Last month	0	0	1	2	3
Several months ago	2	1	2	7	12
(c) Every day	0	0	0	0	0
Week ends only	0	1	1	1	3
Several times a week	0	0	0	1	1

TABLE VIII

SUMMARY OF SURVEY DATA FOR MACHINE NO. 6<sup>a</sup> (CONTINUED)

Question	Block				Total
	No. 1	No. 2	No. 3	No. 4	
6. (c) Several times a month	0	0	0	0	0
Occasionally	0	0	0	1	1
Rarely	1	1	2	5	9
(d) Purchased during morning	0	0	0	1	1
afternoon	0	1	0	1	2
evening	2	1	5	7	15
(e) Do special occasions increase your need for milk? Yes	2	1	4	6	13
No	0	1	1	4	6
7. Vending machines are of no interest to me	0	0	0	0	0
Good thing, might try them	0	0	0	0	0
Buy milk only in bottles; do not use cartons	0	0	0	0	0
Buy at local store; not aware of vending machines	0	0	1	0	1
Rather have quarts than 1/2 gallons	0	0	0	0	0
Powdered milk used for drinking	0	0	2	0	2
Machines are convenient while driving or returning from work	0	0	0	0	0
Lowering price would influence my trade	0	0	0	0	0
Change is a problem	0	0	0	0	0
O. K. as is	1	0	0	1	2
Machine should be more easily recognized	2	1	1	4	8
Could be more conveniently located	0	0	0	3	3

<sup>a</sup>Some interviewees gave two answers for several questions, others gave no answers for a question thereby causing figures within columns to disagree with totals. Grand totals were obtained by taking first answers only.

The daily average consumption of milk per family during the previous week was 1.4 quarts. Sutherland Village and Sequoyah Hills families consumed an average of one pint of milk per day more than Forest Hills Apartments and Weisgarber sections. The total consumption of this area was slightly higher than other areas. Their reaction to outdoor milk vending machines has been summarized in Table VIII.

#### General Survey Results

Six areas have been discussed which indicate the acceptability of outdoor milk vending machines in Knoxville. A comparison of factors within each area would give an idea of the degree of success or failure of the new business, but the purpose of the study is to determine the general acceptance of the innovation as a whole. A consolidation of the six areas covered has given figures upon which conclusions can be drawn. During the course of the house-to-house survey, 874 homes were visited and 770 schedules were completed. Table IX gives a summary of Interview Response.

Fifty-seven percent of those interviewed had heard of the outdoor milk venders through various sources but only 15 percent of those questioned had used them. Of those who had purchased from the machines, less than 10 percent were daily customers and only 30 percent purchased more often than once a month. Daily sales of the Automatic Dairies Company for an eight-month period, July, 1954 through February, 1955 confirms comments of those interviewed. From October, 1954 on, monthly sales declined except in December when two machines were converted from half-gallon vends to quart

TABLE IX

SUMMARY OF SCHEDULE RESPONSE FOR EACH AREA GIVING SUBTOTALS  
AND TOTALS OF FINAL ACTION OF SCHEDULES<sup>a</sup>

Response	Area #1	Area #2	Area #3	Area #4	Area #5	Area #6	Totals
No milk used	9	7	3	3	10	2	34
Refused interview	5	6	4	1	4	3	23
Empty houses	1	2	1	3	3	2	12
Not at home after 3 day call and one night visit	16	9	12	9	12	11	69
Total incomplete schedules	31	24	20	16	29	18	138
Those using milk	128	138	104	108	151	107	736
Total schedules taken	159	162	124	124	180	125	874
Total schedules complete	137	145	107	111	161	109	770
Total schedules incomplete	22	17	17	13	19	16	104
Check	159	162	124	124	180	125	874

<sup>a</sup>Total figures indicate number of families living in each area selected and bounded prior to survey.

sales. Advertising during the first months could have been the reason for slight increases. If almost 50 percent of the people in a one-mile radius do not know the machines exist, previous merchandising attempts had not accomplished its purpose. Other problems exist, since the majority of those who tried the machines did not continue patronizing them. With 64 percent of the patrons only occasionally or rarely using the machines, something is basically wrong; the comments given by these people are listed in Table X and a sample schedule lists the questions (appendix B). The most frequent comment was, "Stores are more convenient." This would indicate that a project of this nature does not fit into local buying habits, has not been introduced so that potential patrons are aware of the good features of the service, or the location of the units were not in areas of need.

#### Effect of Nearby Competition

The number of super-markets and neighborhood stores existing within or very close to the areas surveyed has been plotted (figure 4). Buying habits are difficult to change, particularly when eight well-placed super-markets are open 24 hours a day, seven days a week, and numerous smaller neighborhood stores remain open quite late in the evening seven days a week. For its size, Knoxville has a very high percent of outlets open during most purchasing hours. Vending machines, placed in the proximity of these stores which offer a fairly complete line of groceries, would require very special offers to compete with established buying habits.

TABIE X

CONSOLIDATION OF SURVEY DATA - SIX AREAS, KNOXVILLE, TENNESSEE, 1955

Question	Machine						Total
	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	
1. (a) Milk purchased from route delivery	75	73	94	80	40	81	443
(b) Milk purchased from store	53	64	18	26	106	23	290
(c) Milk purchased from other sources	3	6	2	3	7	4	25
2. (a) Homogenized milk bought in quart equivalents last week	682	596	660	564	675	751	3,928
(b) Regular milk bought in quart equivalents last week	351	302	375	246	635	295	2,204
3. (a) Price paid for homogenized milk							
(b) Price paid for regular milk							
4. Have you bought from a milk vending machine? Yes	14	18	29	17	21	20	119
No	114	116	79	87	130	86	612
5. Have you heard of milk vending machines? Yes	85	73	65	60	95	58	436
No	28	44	12	26	31	23	164
(a) Don't recall	10	9	0	4	10	10	288
By reading paper or magazines	4	10	3	2	5	3	27
Listening to radio or TV	5	3	1	1	2	3	15
First heard from a friend	6	8	5	5	7	4	35
Saw a Wolfe vending machine	4	2	24	0	3	3	36
Saw an Automatic Dairies vending machine	56	40	38	53	74	41	302
(b) Have you heard anyone speak of them? Yes	19	23	19	12	29	18	120
No	50	40	38	3	58	36	225
(c) Good for those who use large or small amount of milk	15	9	23	29	14	2	92
Good for those with small children	1	2	0	14	2	2	21
Good for those traveling with children	12	15	3	0	6	12	48
Good for outings and picnics or those with cars	3	4	4	15	6	4	36
Question product or undecided	2	1	3	4	3	0	13

TABLE X

CONSOLIDATION OF SURVEY DATA - SIX AREAS, KNOXVILLE, TENNESSEE, 1955<sup>a</sup> (CONTINUED)

Question	Machine						Total
	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	
5. (c) Fine for purchase if stores are closed or extra milk is needed	36	17	16	13	52	29	163
O. K. if conveniently located or those who don't buy regularly	10	8	3	0	8	11	40
(d) Have tried but machine did not work	0	0	1	1	0	0	2
Good if price were lower	0	0	1	2	0	0	3
Not interested, does not appeal to me	1	2	3	0	1	2	9
Do not change milk for children	1	0	0	2	1	0	4
Get enough milk from store	3	3	2	3	1	7	19
Have had no need for extra milk	7	16	23	19	2	9	76
Store is more convenient	35	22	25	20	63	15	180
Dairy delivery is more convenient	29	17	6	8	20	26	106
Machines are not convenient	3	9	2	1	9	3	27
(e) Do you have need for extra milk in a hurry? Yes	11	18	7	11	9	14	70
No	22	27	7	11	19	10	96
(f) Would you purchase from vending machines if they were located conveniently? Yes	11	13	4	7	22	13	70
No	22	32	9	14	7	11	95
6. (a) Purchase from which machine							
(b) Yesterday	1	2	0	1	4	1	9
Last week	4	5	0	5	2	2	18
Last month	3	5	0	9	2	3	22
Several months ago	5	6	3	0	13	12	39
(c) Every day	1	1	4	1	2	0	9
Several times a week	1	3	3	0	2	1	10
Week ends only	2	3	5	0	2	3	15
Several times a month	1	0	4	4	0	0	9
Occasionally	5	3	14	4	4	1	31



TABLE X

CONSOLIDATION OF SURVEY DATA - SIX AREAS, KNOXVILLE, TENNESSEE, 1955<sup>a</sup> (CONTINUED)

Question	Machine						Total
	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	
6. (c) Rarely	1	7	17	5	6	9	45
(d) Purchased during morning	2	2	1	0	4	1	10
afternoon	3	3	6	8	5	2	27
evening	10	15	20	9	11	15	80
(e) Do special occasions increase your need for milk?	9	5	15	12	17	13	71
Yes	4	14	13	3	3	6	43
No	0	0	0	3	0	0	3
7. Vending machines are of no interest to me	0	1	1	3	0	0	5
Good thing, might try them	2	2	1	0	0	1	6
Buy milk only in bottles; do not use cartons	2	0	0	2	1	0	5
Buy at local store; not aware of vending machines	0	2	2	1	0	2	7
Rather have quarts than 1/2 gallons	0	1	1	6	1	0	9
Powdered milk used for drinking	0	3	0	1	0	0	4
Machines are convenient while driving or returning from work	0	1	1	5	0	1	8
Lowering price would influence my trade	0	3	1	4	1	3	17
Change is a problem	2	3	4	7	18	8	75
O. K. as is	9	11	21	7	18	8	75
Machine should be more easily recognized	0	0	0	1	0	0	1
Could be more conveniently located	0	0	0	1	2	5	8
Not aware of vending machines in Knoxville	0	1	0	0	0	0	1
Cas Walker	0	0	2	0	0	0	2
Don't know how they work	0	0	0	2	0	0	2

<sup>a</sup>Some interviewees gave two answers for several questions, others gave no answers for a question thereby causing figures within columns to disagree with totals. Grand totals were obtained by taking first answers only.

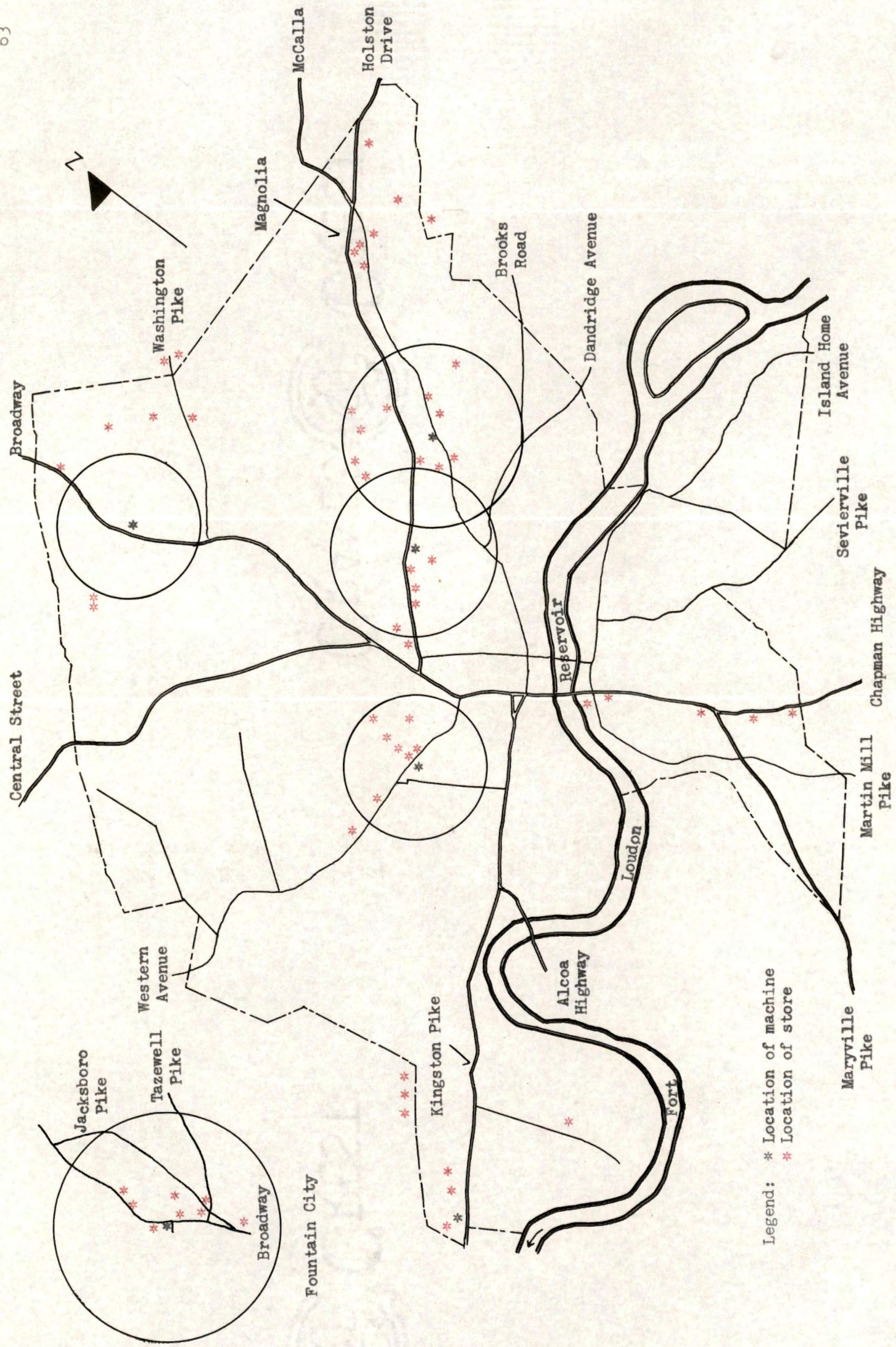


Figure 4. Location of stores in and near areas of survey in Knoxville, Tennessee, 1955.

### Success of the Enterprise

Fifty-six percent of those surveyed had their milk delivered at home; 37 percent purchased milk at the store; 4 percent used no milk; and 3 percent purchased milk from a friend, brought it from their farm, kept a cow, used a major portion of powdered milk, or purchased from a milk vending machine. After nine months of operation the outdoor milk vending machines have had no perceptible effect on the local market.

The service rendered was above question, for only a negligible group commented on problems confronted while using a vender. The majority admitted that their present purchasing pattern was more convenient, but if an emergency arose the machines would be of value.

The per capita volume consumption of milk in Knoxville is much lower than good health requires (table I). This fact can be approached from an individual affinity for milk or its cost. Daily average consumption per family during this survey was 1.09 quarts and there was not a vast difference in volume consumption between economic groups. Families receiving home delivery usually had children and a greater volume was purchased by them than by those buying from other sources (table XI). Thirty-nine percent of those using route delivery used between six and ten quarts per week; 49 percent of those purchasing from stores used from one to five quarts per week; and 40 percent of those purchasing from other sources used between one and five quarts per week. Price could be considered a factor causing low-volume consumption but only 53 percent of those interviewed knew the price of milk and some of these guessed (table XII). The survey of active customers indicated the majority were not aware

TABLE XI  
 FAMILY MILK PURCHASES BY NUMBER AND PERCENT AS TAKEN FROM  
 KNOXVILLE SURVEY, FEBRUARY 1955

Amount of milk purchased last week	Route delivery		Store purchase		Other source		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
None	7	1.6	25	7.7	2	10.0	34	4.6
1-5 quarts	116	27.1	158	49.0	8	40.0	282	36.5
6-10 quarts	168	39.3	87	26.9	7	35.0	262	34.1
11-15 quarts	87	20.3	31	9.9	1	5.0	119	15.4
16 or more quarts	50	11.7	21	6.5	2	10.0	73	9.4
Total	428	100.0	322	100.0	20	100.0	770	100.0

TABLE XII

PURCHASERS' KNOWLEDGE OF PRICE PAID FOR MILK,  
KNOXVILLE, TENNESSEE, FEBRUARY 1955<sup>a</sup>

Machine	No. knowing price	No. not knowing price	Percent not knowing price	Percent knowing price	Total survey per area
1	73	57	44	56	130
2	75	65	46	54	140
3	56	58	51	49	114
4	52	48	48	52	100
5	91	71	44	56	162
6	51	56	48	52	107
Total	398	355	47	53	753

<sup>a</sup>Source: Knoxville Survey.

the market price of milk (appendix C). The price of milk through the vending machine was changed the first of February to 45 cents per half-gallon for Grade A homogenized milk, including tax. This was four cents under store and home delivery prices but sales continued to decline at the vending locations.

The survey indicated only a small percentage of those questioned were in doubt of the quality of milk in the venders or undecided about the service. Lack of progressive advertising contributed greatly to doubt of product and lack of knowledge of venders. Community information and education was barely scratched. Too many people did not know the machines existed and many others commented on their inconvenient location. These two factors appear to be the greatest contributing cause for failure. The outdoor milk vending machine is not a competing device with stores or home delivery. As it is presently established, the enterprise studied is not capable of successful operation.

## CHAPTER V

### COMPARISON OF KNOXVILLE MARKETS WITH OTHER AREAS

The only available means of market comparison between Knoxville and other areas are sales volumes per machine per day. No data comparable with this survey could be located in other areas; therefore, it has been necessary to compare this market with others based on comments and reports released to date.

#### Factors Affecting Sales Volume

Every phase of this enterprise has the tendency of affecting the volume of sales. During this study, quality of the milk seemed to be the least overall problem. None of those who used the machines had a complaint of quality and only a small percent of those who had not used the machine questioned the quality of the product sold. A few families had used one brand of milk for years and would not change unless their preferred brand was vended, while several families did not change brands while children were small (table X). Generally, quality of the product would not be considered a limiting factor of the Knoxville vending project. Factors affecting sales volume fall into the category of competition. Service, convenience, accessibility, and price are competitive factors from the standpoint of distributors and buyers. The vending project has not appealed to a portion of the market sufficiently large to necessitate competitive steps by other distributors. Mr. Dale E. Butz, Extension Specialist, Michigan State College, relates a price drop by stores in the Lansing

area to meet the price set by outdoor milk venders.<sup>1</sup> No such need arose in the Knoxville market. On the other hand, venders compete for the consumers' trade by offering the competitive factors just mentioned. One or all of these factors must be sufficiently strong to draw the desired business.

#### Service Required to Maximize Sales

In the Chicago, Minneapolis, Trenton, and New York areas,<sup>2</sup> organizations placed automatic milk venders in heavily populated areas, and, with initial advertisement, were able to establish volume sales which met a minimum of one hundred sales per machine per day.<sup>3</sup> No figures are available which give the population within a radius of one mile of each machine, but a figure of four thousand families has been set as a minimum.<sup>4</sup> These concerns mentioned placed both single and double-vend units. No sampling work was done in Knoxville prior to the installation of single-vend machines.<sup>5</sup> Results from other areas and data from the Knoxville

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<sup>1</sup>Letter from Dale E. Butz, Extension Specialist in Agricultural Economics, Michigan State College, East Lansing, Michigan, to John Carter, dated January 24, 1955.

<sup>2</sup>Stewart Johnson, op. cit., "Experiences in Machine Vending of Milk," pp. 23-24.

<sup>3</sup>Norman Myrick, "How Much Profit in Vending," American Milk Review, August 1954, p. 26; Stewart Johnson, op. cit., "Experiences in Machine Vending of Milk," p. 25.

<sup>4</sup>Stewart Johnson, op. cit., "The Marketing of Milk Through Vending Machines - Problems, Possibilities, and Outlook," p. 6.

<sup>5</sup>Roger Anderson, Co-owner, Automatic Dairies Company, Knoxville, personal interview, January 20, 1954.



market caused the conclusion to be drawn that half-gallon units were becoming more popular for local use (table XIII). All six units, when installed, were set to vend half-gallon containers. Grade A homogenized milk was used because its consumption was increasing sufficiently to indicate the majority of consumers desired it. In December 1954, the daily average consumption of homogenized milk in quarts was over twice the number of regular quarts and homogenized half-gallon consumption exceeded half-gallon regular use by more than five thousand units (table XIII). The reaction of the majority of the buying public in Knoxville was not favorable to milk vended in half-gallon containers.<sup>6</sup> Comments from customers indicated quarts were sufficient for emergency use, travelers, picnics, and other needs.<sup>7</sup> As a result of several months' requests, two of the six machines were converted to quart-container vends.<sup>8</sup> Even though quarts were more expensive by volume than half-gallons, sales at both machines increased (figures 5 and 6). This change was not advertised, so regular customers or those who saw the machines were the only ones who realized the change.

The following comments, only in part, indicate the type of service required. During a number of interviews, persons stated that Automatic Dairies Company was forcing them to buy a company-selected size of product

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<sup>6</sup>Interview with six location attendants divulged these general comments of patrons, December 1954.

<sup>7</sup>Survey results given in Table XI.

<sup>8</sup>Roger Anderson, op. cit.

TABLE XIII

A SIX-MONTH SUMMARY OF THE DAILY AVERAGE CLASS I UTILIZATION OF MILK  
SHOWING A UNIT BREAKDOWN OF EACH ITEM SOLD,  
JULY 1953 - DECEMBER 1954<sup>a</sup>

Months	Standard milk		Homogenized milk	
	1/2 gallons	Quarts	1/2 gallons	Quarts
<u>Daily average</u>				
July 1953	8,221	27,831	7,071	19,496
August 1953	8,324	27,726	7,421	20,593
September 1953	8,726	27,783	8,187	20,955
October 1953	9,031	27,748	8,802	21,791
November 1953	8,824	25,761	8,890	20,450
December 1953	9,486	25,515	9,812	20,835
January 1954	9,795	25,120	10,488	21,342
February 1954	10,206	24,175	11,365	20,342
March 1954	10,213	23,765	11,747	20,663
April 1954	9,771	22,508	11,827	20,207
May 1954	9,235	20,990	11,800	19,832
June 1954	9,275	20,527	12,333	21,003
July 1954	9,508	21,971	13,726	23,019
August 1954	9,265	20,680	14,828	22,831
September 1954	9,693	21,894	16,345	24,568
October 1954	9,726	21,451	17,082	25,067
November 1954	9,895	20,976	18,450	25,224
December 1954	10,828	26,151	22,881	31,971

<sup>a</sup>Source: Federal Order No. 88 (mimeographed), Daily Average Gross Class I Utilization of Milk in the Knoxville Marketing Area, U.S.D.A., P.M.A., Dairy Branch, Knoxville, January 1955.

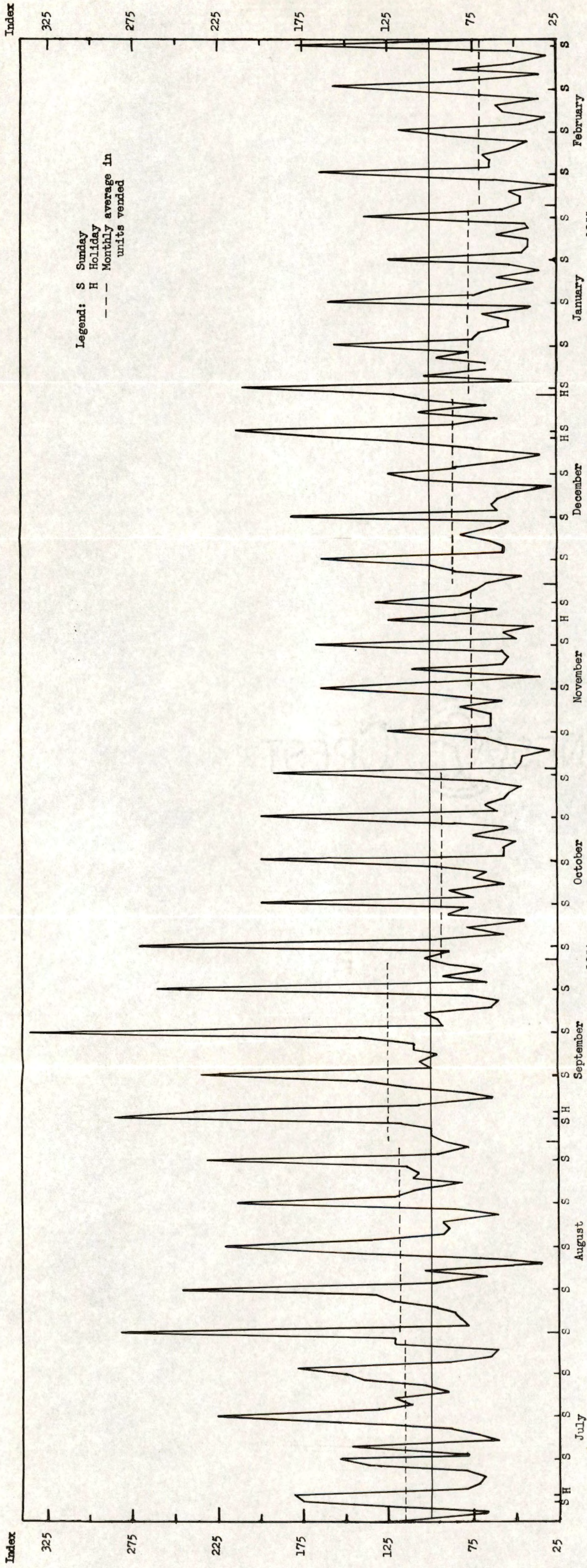


Figure 5. Index of number of units of milk vended daily through outdoor machines, July 1954 - February 1955. (Average daily sales July 1954 - February 1955 = 100)  
 Source: Data obtained from Automatic Dairies Company, Knoxville, Tennessee

Index

325

275

225

175

125

75

25

Legend: S Sunday  
 H Holiday  
 --- Monthly average in  
 units vended

February

1955

January

December

November

October

1954

September

August

July

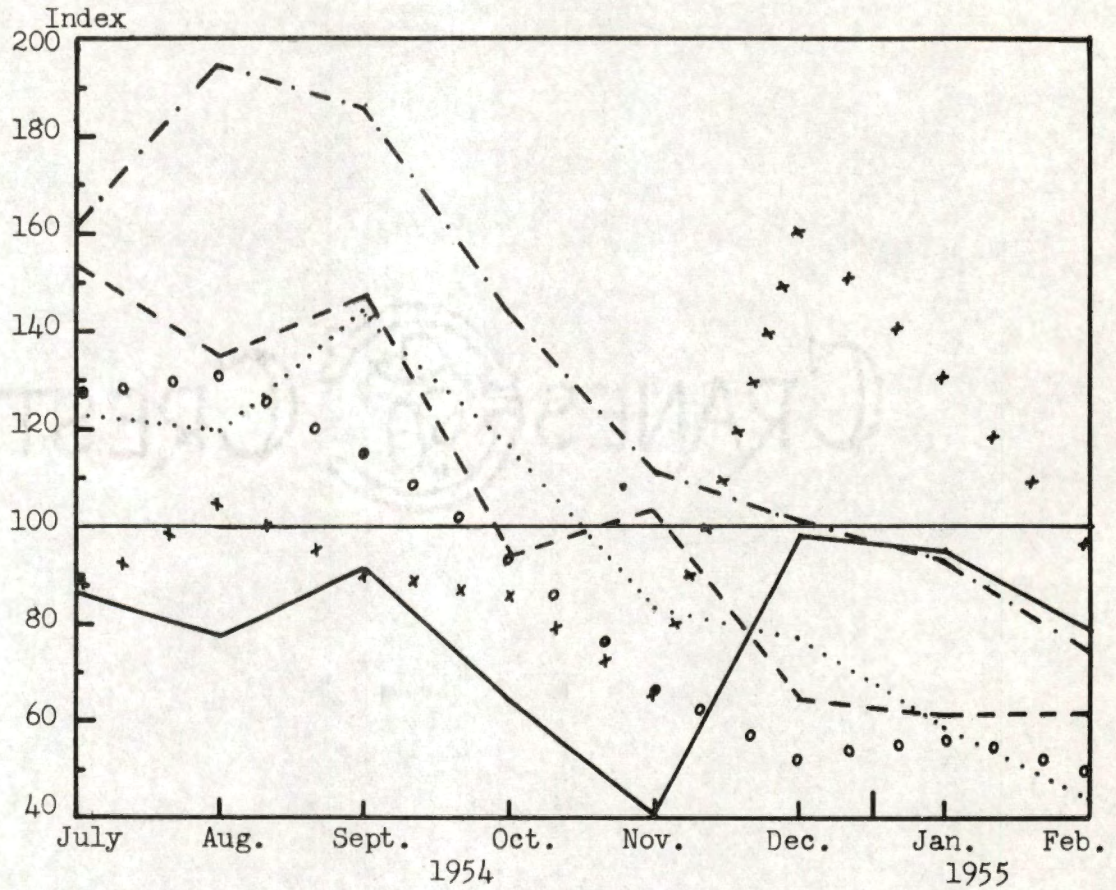
Newspaper advertising, special location spread in Sunday paper, WNOX.

Large Sunday ad in News-Sentinel.

Three daily radio spot announcements featuring "Audie the Cow".

Bicycle given away - not advertised other than cards on carton.

Machines #1 and #5 converted from one-half gallon to quart containers.



Machines 1 and 5 were converted from one-half gallon to quart vends in December 1954.

Legend:

- #1 machine
- ..... #2 machine
- - - #3 machine
- . - #4 machine
- \* \* #5 machine
- • #6 machine

Figure 6. Index of average monthly sales of milk vended through outdoor machines, July 1954 - February 1955<sup>a</sup>

Source: Data obtained from Automatic Dairies Company, Knoxville, Tennessee

rather than the size to fit their needs. Other service comments made during interviews indicated a desire for shelter over the front of the vender for protection during rainy weather, less congregation of parked cars around the front of the machines, paper bags available to place milk in so wet container would not soil car, and some way to improve the coin change problem. The latter point was touched on a number of times and several indicated a necessity to wait long periods of time for station attendants to give change or that some attendants acted as if the customer was being done a great favor. No community surveys of this type have been obtained from other areas, but the local survey developed a number of points where service could be improved. Some of those mentioned lost customers for the local business.

Until a market is established, several dual-vend units should be used to determine on-the-spot sales preferences in several localities. From these tests single units can be established in areas where the majority of sales swing toward one-container size.

#### Effect of Location on Sales

The most frequent comment during the survey was about the location or convenience of the machines. This point was discussed earlier under Initial Findings in Chapter III. The development at this point has to do only with the location's affect on sales. Inconvenience of a location will restrict sales and, as an end result, defeat the business. Several of the observations found in the summary of consumer comments (appendix C) state, "for children's safety, machines should not be located near

dangerous intersections; machines should be more easily accessible; and machines are poorly located and are not advertised enough to let you know where to find them." Convenience of location in one of several approaches was mentioned by 69 percent of the total interviewed (table X). This would indicate that the greatest limiting factor to the local concern was location of machines, but the problem was not so easy as to say, "Move the machines and all will be well." A research project should be completed to determine the proper locations for best sales.

#### Price Changing and Its Affect on Sales and the Remainder of the Market

In other areas, price changing has had some testing, as covered in Chapter II. The local business made a price change on half-gallons in the eighth month of operation but no advertising accompanied it. During the period of July, 1954 through January, 1955, the price of half-gallon containers of Grade A homogenized milk was 48 cents, including tax. In February, 1955 this price was changed to 45 cents per half-gallon, including tax. Sales for the company continued to decline (figure 5). The price for the quart containers of the same type milk was established at 25 cents, including tax, in December, 1954 and no further change took place. The convenience of a single coin was in favor of the quart container and several customers commented favorably (appendix C).

Price was not an active factor of the Knoxville business. Sales were so low that no competitor paid attention to the change. The only comment made concerning price was in relation to the change problem and difficulty of placing coins in proper slots in the proper order. One person suggested a 50 cent coin device to solve the problem.

### Seasonality of the Enterprise

The study in the Knoxville area covered the period July, 1954 through February, 1955. Sales increased slightly during August and September, 1954 and then slowly declined during the other months, except December, 1954 which was caused by a change to quart containers in two machines (figure 6). It would be normal to expect visits to outdoor venders to decrease during winter months. Transient travel was at a minimum while outdoor sports and picnics were at a standstill. Going out on a cold winter night at all is something most families hold to a minimum. Spring, summer, and fall have been high months in other areas, and reports for spring anticipate a boom year for outdoor milk vending machines.<sup>9</sup> The first season for Automatic Dairies Company showed a seasonality of sales. All of their problems were not due to the weather, but other areas have indicated a winter slump.<sup>10</sup>

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<sup>9</sup>G. R. Schreiber, "The Opportunity of Outdoor Selling," Vend Magazine, 8: 44, July 1954; Feature Article, "Milk Vending: An Answer to a Problem," Vend Magazine, 8: 70, July 1954.

<sup>10</sup>Feature Editorial, op. cit., "Automatic Dairies Build New Business," p. 53.

## CHAPTER VI

### FUTURE OF MILK VENDING IN THE KNOXVILLE AREA

The population of Knoxville has not accepted the outdoor milk vending machine in sufficient quantities to make it a profitable business. Based on this study, conditions exist in the vending business which have not appealed to the potential customers who have set buying habits that will take time to change.

From the standpoint of the business, sufficient advertising was not performed to acquaint the public with the service and its features. Equipment initially purchased for the job was too expensive and too limiting for testing and development of this market. Not one change in machine location took place during the first ten months of operation. Businesses studied by this firm made a policy of moving a machine in 120 days that did not meet minimum required sales.<sup>1</sup> Even though none of the machines in Knoxville ever met a minimum requirement, no change was made and what little advertising was started at the beginning came to a complete halt at the end of the third month of business. Not one person interviewed made mention of learning of the business and its service through the company representative who visited one thousand homes in each area.<sup>2</sup> The questionnaire used in the survey was short and simple, yet it

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<sup>1</sup>Feature Editorial, "Highest Value Sales Ever," The Milk Dealer, Collection of Milk Vending Feature Articles, The Olsen Publishing Company, 1954, p. 39.

<sup>2</sup>Roger Anderson, op. cit.



required almost two months for two people to complete 770 schedules in the six areas. The response to advertising has been given in Table XIV to show the extent of coverage. The initial pattern of appeal established the first month of operation was not changed until the sixth month (two machines converted to quart vends) and the second change came in the eighth month (reduced price of half-gallon cartons) which in the mind of the writer was too little, too late. No major attempt was made through research methods to determine the reduced sales each month after September, 1954.

The comments in reference to the business are offered constructively, to point up the action taken in the local market and its possible affect on another enterprise.

From the standpoint of the customer, a new merchandising technique must offer a service which has not been previously established to activate a desire for change in the pattern of purchase. To increase the family consumption of milk, which is the purpose of the outdoor milk vending enterprise, one must think of the vending machine when supply is short rather than waiting until the next milk delivery or trip to the store. The nearest parallel in modern merchandising is outdoor ice vending machines. Crushed ice is more difficult to obtain since it is not stocked by every corner grocery, and several vending locations in Knoxville are selling a \$1000.00 in ice a month during the summer. These locations, at the outskirts of town, are on major highways. Extra milk is normally used when crushed ice is purchased for homemade ice cream or outdoor picnics and sporting. The customer must be educated through merchandising

TABLE XIV

 INDIVIDUAL RESPONSE TO ADVERTISING BY MACHINE AREA  
 SEPTEMBER - OCTOBER 1954

Advertising program	#1	#2	#3	#4	#5	#6	Total	Outside <sup>a</sup>	Grand total
"Audie the Cow"	21	35	28	54	18	23	179	12	191
Bicycle	24	31	90	38	46	54	283		
	<u>C-U<sup>b</sup></u>	<u>C-U</u>	<u>C-U</u>	<u>C-U</u>	<u>C-U</u>	<u>C-U</u>			
No. of bicycles	1-12	1-9	1-29	2-12	1-17	1-23			
Cards per individual	1-3	1-7	1-25	1-8	1-12	1-11			
	1-2	1-5	1-14	2-2	1-4	1-5			
	7-1	1-3	1-3	2-1	1-3	1-4			
		1-2	5-2		2-2	1-3			
		5-1	1-9		6-1	1-2			
						6-1			
	24	31	90	38	46	54			
"Audie the Cow" ordered per individual	2-2	1-3	3-2	1-4	1-2	1-4			
	17-1	1-2	22-1	2-3	16-1	3-2			
		30-1		3-2		13-1			
				38-1					
	21	35	28	54	18	23			

<sup>a</sup>Outside: Dayton, Tennessee  
 Huntingdon, Tennessee  
 Kingston, Tennessee  
 Monticello, Tennessee  
 Charlotte, North Carolina  
 Memphis, Tennessee  
 Oak Ridge, Tennessee (3)  
 Concord, Tennessee (2)

<sup>b</sup>C - customers  
 U - units

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techniques to think of the milk vending machines when there is a need for extra milk. It has never been the reaction of a person to try, then accept and use a facility which was more trouble than outlets previously used. A number of families tried the innovation but few continued it and the percent trying the milk venders was too small. It could be that the Knoxville area offers a higher percentage of 24-hour stores than areas in which the outdoor milk venders have been so successful.

The comments of this chapter have a direct bearing on the future of outdoor milk vending in the Knoxville area, for during the first week of April, 1954, at the beginning of the increased buying season, Automatic Dairies Company went out of business. This operation was a milk distributing concern, not a producing dairy. Its entire business was in milk sales through outdoor machines. If a market is to be developed on a trial-and-error basis, it would not be wise for a distributor to attempt the project unless other successful milk outlets existed. Wolfe Dairies has had four small indoor milk venders installed outdoors in the Knoxville area. Vandalism and lack of advertising have limited customer response. The dairy is not happy with the outdoor sales. One unit has been inoperative in the Chapman Highway area at the city limits for months with no sign on it. This act and the condition of the unit has been poor advertising for outdoor milk vending service. Other states have shown that dairies are capable of increasing sales of their product, on a small scale, by using outdoor milk vending machines and provide excellent in-town refrigerated

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storage space for delivery men.<sup>3</sup> The future of the Knoxville market is dependent upon the study a potential entrepreneur accomplished prior to business operation.

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<sup>3</sup>Feature Editorial, "Milk Vending Take Home Market Booms," Vend Magazine, 8:91, September 1954; Feature Editorial, "Dairymen Scramble Into Milk Vending," Vend Magazine, 8:76-78, December 1954.

## CHAPTER VII

### SUMMARY AND CONCLUSION

The purpose of this problem was to perform a study of a Knoxville outdoor milk vending operation, to make a survey of active and potential customers of this business, and to compare the local enterprise with similar businesses in other regions. This study covers the operational period of the Automatic Dairies Company from its inception in July, 1954 through February, 1955. The two outdoor milk vending businesses, located in Knoxville, are the only ones in Tennessee and, to the knowledge of the writer, the only ones in the Southeastern States.

Milk merchandising, from outdoor vending machines, is relatively new in the United States, having begun in 1952. There has been a wide variance in the success this new enterprise has enjoyed but the conditions under which the service has been offered have varied considerably. There has been general agreement that the outdoor milk vending machine is a means for increased milk sales, since its product is available 24 hours every day of the week. In Knoxville, the success of this innovation has not met the minimum expectation of its owners. From both surveys have come corresponding data indicating several reasons to be the cause of poor public acceptance. Convenience of location, preference for a specific size of milk container, lack of knowledge of the service, coin-change problem, poor accessibility, and malfunction have been mentioned as reasons for reduced patronization.

The survey directed at those buying milk from the vending machines during February, 1955 indicated the majority were happy with the service and some of those replying made suggestions which would make the service more acceptable to them. From the 32 replying, only three were daily customers, 17 made Sunday night purchases only, and the remainder made several purchases per week. The majority of sales were made at night. Fifty-two percent were not aware that milk purchased through the vending machine was cheaper than the same quality product from other sources. Even though these patrons were satisfied, their number was not sufficient to keep the machines in operation.

The house-to-house survey, made in the six areas of machine location, covered a cross-section of past, present, and potential customers. This portion of the survey was aimed at determining the reaction of families to the outdoor milk vending service. Normal source of procurement of milk, amount of milk consumed by the family the previous week, and price paid for milk, by type, were also included in the questionnaire. From the house-to-house survey only 15 percent of the families indicated use of the outdoor milk vending machines. Only 57 percent of those questioned had heard of the outdoor, all-hour milk service, and only 27 percent of those who had heard of the milk venders had used them. Patronage of the machines was at a declining rate, which could have been due to seasonal trends experienced elsewhere in the nation. The survey indicated the major reasons for declining sales were attributed to poor accessibility, inconvenience of location, size of containers vended, and coin-change problems. The reasons given by the large percent who had not tried the

service were no knowledge of the machines' existence, present source of supply more convenient, and questioned the product or service. A larger number of families indicated no need for extra milk in a hurry than those who did and 59 percent of those responding to the question, "Would you purchase from a milk vending machine if it were conveniently located," did so negatively. From this picture, it seems the community has no interest in outdoor milk vending, but thorough investigation tends to reveal an uninformed populace. The service, as rendered, has been fundamentally rejected but the reasons developed by this study do not show the cause to be customer indifference. When comparing this business with similar enterprises in other parts of the country, the problems are basically uncomparable, for the business here has not reached the stage of development other regions report, and the phase of operation found here has not been published elsewhere. This study has only introduced a problem and has shown the need for marketing and distribution research. The scientific accomplishment of this research will divulge Knoxville's position in this matter.

With the survey results, and the fact that the business no longer exists, the conclusion seems very definite, but it does not indicate fully that outdoor milk vending will not work in Knoxville. The owners of the business studied were sold on outdoor milk vending, but they failed to sell it to the people of Knoxville. Success of this type enterprise was observed in other areas but the research necessary to determine differences in population and markets was not sufficiently performed prior to beginning operation to arm them with local facts for the best understanding of their

market. Faith in a business must be built and potential patrons must realize the enterprise exists. Knowing how the machines are designed to serve them, the freshness of the product, and occasions when the vending machine can best serve their needs enables the public to better accept the innovation. Each machine assumes the personality of those at its location, not the owners or service representatives, and well-trained attendants must be available to assist promptly and courteously when needed. Location of units is the most important decision after that of deciding to start the service in a community. Research is the only method of location determination. These comments point up several reasons for this business failure. This study covered the entire period of operation. The comments just made tie in very closely with the findings of the study and must be given as a basis for the response obtained.

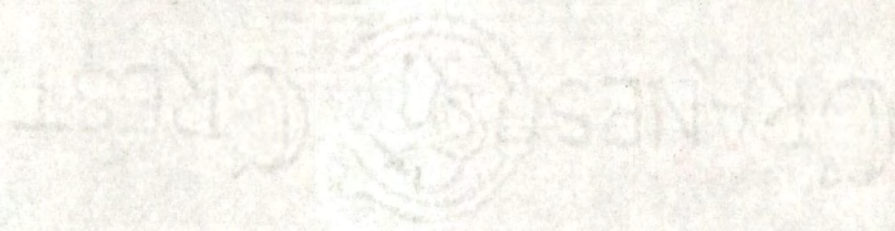
In analyzing a market, no better precept can be offered than to start with the consumer. Such an analysis requires, first, determining the potential buyers and users of milk. Next, buying habits must be examined to determine such factors as the unit, frequency, time, and place of purchase. Buying motives must be appraised to discover what location will be of most interest to the prospective purchasers. Lastly, estimates must be made of the number of prospective customers in order that sales expectations may be established. This analysis was not accomplished for the business under study. There was no experimental phase, only hypothetical comparison. Before the matter can be closed, scientific research is required. Tomorrow, experiential patterns of development around the country will verify the hypothetical trends used through inexperience and necessity today.



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**APPENDIX**

APPENDIX A

COST SUMMARY ANALYSIS OF 20 POLAR DAIRY AUTOMATS FOR AUGUST 1954<sup>a</sup>

Machine <sup>b</sup>	Units sold (quart equiv.)	Location space rental	Depreciation (50 months) <sup>c</sup>	Delivery expense Driver's salary & comm.	Leaker and short-age loss	Electricity metered	Repairs	Service Maintenance	Interest and insurance	Personal prop. taxes	Total costs	Total costs
1	8,674	\$ 21.68	\$ 73.30	\$ 52.50	\$ 8.95	\$ 21.60	\$ 9.00	\$ 20.55	\$ 10.16	\$ 5.10	\$ 247.14	.02849
2	7,762	19.40	55.30	52.50	7.28	19.40	9.00	20.55	7.95	3.33	219.02	.02821
3	11,626	29.06	73.30	52.50	5.66	13.53	9.00	20.55	10.16	5.10	243.16	.02091
4	10,890	27.22	73.30	52.50	17.75	13.89	9.00	20.55	10.16	5.10	253.77	.02330
5	8,834	25.00	55.30	52.50	11.17	17.18	9.00	20.55	7.95	3.33	226.28	.02561
6	17,018	42.54	73.30	52.50	17.81	24.24	9.00	20.55	10.16	5.10	279.50	.01642
7	18,238	45.59	73.30	52.50	25.41	21.04	9.00	20.55	10.16	5.10	286.95	.01573
8	6,290	15.72	55.30	52.50	19.43	17.45	9.00	20.55	7.95	3.33	225.53	.03585
9	8,988	22.47	55.30	52.50	35.66	11.80	9.00	20.55	7.95	3.33	242.86	.02702
10	7,760	19.40	55.30	52.50	33.97	11.27	9.00	20.55	7.95	3.33	237.57	.03061
11	5,738	14.34	55.30	52.50	18.85	19.34	9.00	20.55	7.95	3.33	225.46	.03929
12	8,864	22.16	55.30	52.50	16.74	11.10	9.00	20.55	7.95	3.33	222.93	.02515
13	6,600	16.50	55.30	52.50	.37	11.35	9.00	20.55	7.95	3.33	201.15	.03048
14	12,784	31.96	73.30	52.50	32.03	23.93	9.00	20.55	10.16	5.10	282.83	.02124
15	5,040	12.60	55.30	52.50	47.77	11.05	9.00	20.55	7.95	3.33	244.35	.04848
16	10,898	27.24	55.30	52.50	69.50	10.96	9.00	20.55	7.95	3.33	280.63	.02575
17	6,320	15.80	55.30	52.50	13.63	17.18	9.00	20.55	7.95	3.33	219.54	.03474
18	4,996	12.49	55.30	52.50	20.60	19.96	9.00	20.55	7.95	3.33	225.98	.04523
19	6,130	15.32	55.30	52.50	10.97	19.22	9.00	20.55	7.95	3.33	218.44	.03563
20	5,840	14.60	55.30	52.50	9.98	11.61	9.00	20.55	7.95	3.33	209.12	.03581
Total	179,290	451.10	1,214.00	1,050.00	423.53	327.10	180.00	411.00	172.26	77.22	4,792.21	.02673
Average	8,964	.00250	.00677	.00585	.00237	.00183	.00101	.00229	.00096	.00044		

<sup>a</sup>Source: Land O'Lakes Creameries, Inc., General Offices, Minneapolis, Minnesota

<sup>b</sup>Machines located at: Falcon Heights (2), Roseville (1), So. St. Paul (2), Anoka (2), No. St. Paul (1), White Bear Lake (2), Forest Lake (1), Columbia Heights (2), Spring Lake Park (1), Little Canada (2), St. Louis Park (1), Richfield (1), Bloomington (2).

<sup>c</sup>Includes sign.

<sup>d</sup>Travel and salary.

<sup>e</sup>per quart plant to consumer.

APPENDIX B

SAMPLE SCHEDULE

Name \_\_\_\_\_ Schedule No. \_\_\_\_\_  
Interviewer \_\_\_\_\_  
Date \_\_\_\_\_  
Address \_\_\_\_\_

1. How did you purchase your milk?  Rt. Del.,  Store,  Other
2. How much milk (Homogenized plus Regular or Standard) did you buy from all sources last week? \_\_\_\_\_ Quarts?,  
\_\_\_\_\_ Half Gallons?
3. What price do you pay for Grade A (Homogenized) (Regular or Standard) Milk? \_\_\_\_\_ Quarts?, \_\_\_\_\_ Half Gallons?
4. Have you ever bought from an outdoor milk vending machine?  
\_\_\_\_\_ if yes, skip to item 6, \_\_\_\_\_ if no, continue with item 5.
5. Have you heard of the outdoor milk vending machines in Knoxville? \_\_\_\_\_ if yes, continue through D, \_\_\_\_\_ if no, skip to E.

A. How did you first hear of them?

\_\_\_\_\_  
\_\_\_\_\_

Heard,  
No  
Purchase

B. Have you heard anyone else speak of them?  Yes  No

C. What do you think of the outdoor service?

\_\_\_\_\_  
\_\_\_\_\_

D. Why haven't you purchased from vending machine?

\_\_\_\_\_

Not  
Heard

E. Do you ever have need for fresh, cold milk in a hurry?

\_\_\_Yes \_\_\_No

F. Would you purchase from a vending machine if one were located nearby? \_\_\_Yes \_\_\_No

Have  
Purchased

6. A. From which machine have you purchased? # \_\_\_\_\_

B. When was your last purchase made? \_\_\_\_\_

C. How often do you use the outdoor machine? \_\_\_\_\_

D. At what time during the day do you purchase? \_\_\_\_\_

E. Do week-ends, holidays, and outings increase your milk needs? \_\_\_\_\_

7. How can service be improved? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

APPENDIX C

CONSUMER COMMENTS AND BUYING HABITS

	Schedule number								
	1	2	3	4	5	6	7	8	9
Home delivery	x	x			x			x	x
Store purchases				x			x		x
Purchased other sources			x			x			
Purchased during morning							x		
Purchased during afternoon									
Purchased during night	x	x	x	x	x	x		x	x
Purchase Monday			x	x			x		x
Purchase Tuesday			x						
Purchase Wednesday	x		x	x			x		
Purchase Thursday			x						
Purchase Friday			x	x		x	x		
Purchase Saturday			x			x			
Purchase Sunday	x	x	x	x	x	x	x	x	x
How much did you purchase last week? Quarts	24	8	16	15	5	2	8	7	8
How much did you purchase from a vending machine? Quarts	4	2	16	8	1	2	2	2	1
Does this milk cost more than others?									
Does this milk cost less than others?	x		x	x		x		x	
Does this milk cost the same as others?		x			x		x		x
Machine number	6	3	3	2	1	6	6	4	1
Don't know									

Comments

1. O. K.
2. Put out more machines.
- 3.
4. Service is satisfactory at present.
- 5.
6. If machines sold one quart at a time and took a greater variety of change, I'd use it more.
7. Good service at Ollie Hale's Station.
- 8.
9. The service in my community seems to be quite adequate and I haven't heard any unfavorable comments.

## CONSUMER COMMENTS AND BUYING HABITS (CONTINUED)

	Schedule number							
	10	11	12	13	14	15	16	17
Home delivery			x			x		
Store purchases	x	x			x			x
Purchased other sources						x		
Purchased during morning					x			x
Purchased during afternoon								
Purchased during night		x		x		x		
Purchase Monday					x			x
Purchase Tuesday					x			
Purchase Wednesday					x			
Purchase Thursday					x			
Purchase Friday					x			
Purchase Saturday					x			
Purchase Sunday	x	x	x	x		x		x
How much did you purchase last week? Quarts	4	6	18	-	12	17	-	9
How much did you purchase from a vending machine? Quarts	1	1	4	1	12	4	-	2
Does this milk cost more than others?								
Does this milk cost less than others?	x				x	x		x
Does this milk cost the same as others?			x	x				
Machine number	6	1	5	2	6	6	6	5
Don't know								

Comments

10. Better advertisement, you can't buy from the vender unless you know it's there.
11. This is fine for the public - to be able to pick up milk on our way home - day or night. Quart containers were a great improvement.
12. Service is as good as can be expected in my opinion.
13. Good
14. Keep machine in good working order. Use #6, sometimes have trouble with machine.
15. More vending machines. One in Sutherland Village.
16. Why 50 cents?
17. Run specials occasionally. Machine should be near traffic light or away from dangerous intersections on account of children.



## CONSUMER COMMENTS AND BUYING HABITS (CONTINUED)

	Schedule number						
	18	19	20	21	22	23	24
Home delivery	x	x		x	x	x	x
Store purchases			x	x			
Purchased other sources			x				
Purchased during morning							
Purchased during afternoon		x	x			x	
Purchased during night	x			x	x		x
Purchase Monday							x
Purchase Tuesday							
Purchase Wednesday							
Purchase Thursday				x			
Purchase Friday							
Purchase Saturday			x			x	
Purchase Sunday	x	x	x		x	x	
How much did you purchase last week? Quarts	10	10	16	5	-	14	2
How much did you purchase from a vending machine? Quarts	1	2	2	2	2	2	2
Does this milk cost more than others?							
Does this milk cost less than others?		x		x		x	
Does this milk cost the same as others?	x		x		x		
Machine number	1	2	3	6	2	2	6
Don't know							

Comments

18. Service is fine, convenient especially when I fail to order enough on week ends or find I need extra milk.
- 19.
20. The service suits us fine. We bring most of our milk from our farm. We run out we buy from the store or vending machine. Machine is more convenient.
21. Machines are very poorly located and they are not advertised enough to let you know where to find them.
- 22.
23. We think service is all right like it is.
- 24.

## CONSUMER COMMENTS AND BUYING HABITS (CONTINUED)

	Schedule number							
	25	26	27	28	29	30	31	32
Home delivery	x	x	x					x
Store purchases					x	x	x	
Purchased other sources			x	x				
Purchased during morning	x		x					
Purchased during afternoon				x				x
Purchased during night		x	x		x	x	x	
Purchase Monday			x	x		No		
Purchase Tuesday				x		cer-		
Purchase Wednesday				x		tain		
Purchase Thursday				x		day		
Purchase Friday				x				
Purchase Saturday				x				x
Purchase Sunday	x	x	x	x	x		x	x
How much did you purchase last week? Quarts	26	14	15	14	28	3	8	14
How much did you purchase from a vending machine? Quarts	2	2	8	14	2	-	1	2
Does this milk cost more than others?				x				
Does this milk cost less than others?	x		x			x		
Does this milk cost the same as others?		x			x		x	x
Machine number	2	4	4	1	4	6	5	4
Don't know								

Comments

25.  
 26.  
 27. By having more machines easily accessible.  
 28.  
 29. I found the vending machine to be quite satisfactory. Many thanks to originator.  
 30. O. K. as is.  
 31. Oak Ridge resident.  
 32.

## SAMPLE OF SURVEY CARD

The University of Tennessee Agricultural Experiment Station is conducting a study of vending machines as a means of selling milk. We would appreciate your answering the questions on the attached card which is stamped and self-addressed for your convenience.

Just fill in, detach, and drop in the mail.

If you wish your answers to remain anonymous, you may, but space has been provided for your name and address if you care to give them.

Information for University of Tennessee  
Agricultural Experiment Station

1. How do you usually purchase milk? Home Del. Store Other
  2. When do you normally use a vending machine? Morn. Aft. Night
  3. What days do you use it? Mon. Tues. Wed. Thur. Fri. Sat. Sun.
  4. How much milk did you buy from all sources last week? \_\_\_\_\_  
Qts.
  5. How much from the vending machine? \_\_\_\_\_  
Qts.      1/2 Gal.
  6. Is price of milk in the machine comparable with other sources?  
\_\_\_\_ More      \_\_\_\_ Less      \_\_\_\_ Same
  7. How can service be improved? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- Name \_\_\_\_\_ Address \_\_\_\_\_

APPENDIX D

RESPONSES FROM SCHOOLS, ASSOCIATIONS AND PUBLICATIONS

1. Mr. H. B. Hooper  
Maryland and Virginia Milk Producers Association, Inc.  
1756 Street, Northwest  
Washington 6, D. C.
2. Dr. D. H. Jacobsen  
American Dairy Association  
20 N. Wacker Drive  
Chicago 6, Illinois
3. Mr. Jack R. Seher  
The Olsen Publishing Company  
1445 North Fifth Street  
Milwaukee 12, Wisconsin
4. Mr. Frank Koval, Extension Specialist in Dairy Technology  
Agricultural Extension Service  
Ohio State University  
Columbus 10, Ohio
5. Mr. E. J. Perry, Extension Specialist in Dairy Husbandry  
Extension Service  
College of Agriculture  
New Brunswick, New Jersey
6. Mr. Robert P. Story, Dairy Extension Specialist  
Department of Agricultural Economics  
New York State College of Agriculture  
Cornell University  
Ithaca, New York
7. Mr. Dale E. Butz, Extension Specialist in Agricultural Economics  
Department of Agricultural Economics  
Cooperative Extension Service  
Michigan State College  
East Lansing, Michigan
8. Professor R. W. Bartlett  
Department of Agricultural Economics  
College of Agriculture  
University of Illinois  
Urbana, Illinois

## RESPONSES FROM SCHOOLS, ASSOCIATIONS AND PUBLICATIONS (CONTINUED)

9. Mr. Floyd J. Arnold, Extension Dairyman  
Extension Service  
Iowa State College of Agriculture  
Ames, Iowa
10. Mr. C. D. McGrew, Extension Dairyman  
Agricultural Extension Service  
College of Agriculture  
Ohio State University  
Columbus 10, Ohio
11. Dr. Stewart Johnson  
Professor of Agricultural Economics  
University of Connecticut  
Storrs, Connecticut
12. Dr. Hugh L. Cook, Associate Professor  
Department of Agricultural Economics  
College of Agriculture  
The University of Wisconsin  
Madison 6, Wisconsin

## MANUFACTURER RESPONSES

1. Mr. Robot, 12 East Grant Avenue, Chicago 10, Illinois
2. Norris Dispensers, Inc., Minneapolis 8, Minnesota
3. Meterflow, Evanston, Illinois
4. Refrigeration Engineering Company, Montgomery, Minnesota
5. Dari O Matic, Los Angeles, California
6. Rowe, New York City
7. Land O'Lakes, Minneapolis, Minnesota
8. Ideal Dispenser Company, Bloomington, Illinois
9. Vendo, Kansas City, Missouri

## MANUFACTURER RESPONSES (CONTINUED)

10. Apco, Inc., New York City
11. United Refrigeration Company, Hudson, Wisconsin
12. Meyer-Blake Company, St. Louis 4, Missouri
13. F. B. Dickinson & Company, Des Moines, Iowa
14. Dairy Fresh - S & S Company, St. Louis Park, Minnesota