

AN ANALYSIS OF RETAIL APPLE MARKETING

by

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TABLE OF CONTENTS

<u>Chapter</u>	<u>Page</u>
I. INTRODUCTION	1
Problem	1
Objectives	3
II. REVIEW OF LITERATURE	5
III. METHODOLOGY	16
Design	16
Selection of Stores	16
Procedure	17
IV. ANALYSIS OF RETAIL APPLE MOVEMENT	21
Days on Display	21
Bags	22
Loose	24
Overwraps	24
Variation in Daily Apple Sales	26
Average Quantity Sold as Percentage of Quantity Displayed	29
Spoilage	34
Firmness	35
Bruising	37
Appearance	38
V. RETAIL APPLE MERCHANDISING PRACTICES	40
Store Displays	40
Rotation	42

TABLE OF CONTENTS (Continued)

<u>Chapter</u>	<u>Page</u>
Handling of Fruit	43
Bags	44
Loose and Overwraps	45
Arrivals	46
Pricing	48
Promotion	48
VI. PRODUCE MANAGER SURVEY	50
Container Suitability	50
Merchandising Practices	53
Advertising and Promotion	54
Space Allocation and Pricing Procedures	55
Eastern Versus Western Apples	56
VII. SUMMARY AND RECOMMENDATIONS	58
BIBLIOGRAPHY	63
APPENDIX A	65
APPENDIX B	67
APPENDIX C	73
VITA	77

LIST OF FIGURES

<u>Figure</u>	<u>Page</u>
1. Average Disappearance Rate of Bagged Apples	23
2. Average Disappearance Rate of Loose Apples	25
3. Average Disappearance Rate of Overwrapped Apples ..	27
4. Average Sales of Bagged, Loose and Overwrapped Apples	28
5. Average Bag Display Size Compared to Sales	31
6. Average Loose Display Size Compared to Sales	32
7. Average Overwrap Display Size Compared to Sales ...	33

LIST OF TABLES

<u>Table</u>	<u>Page</u>
1. Determination of Fruit Condition with the Pressure Tester	12

CHAPTER I

INTRODUCTION

Problem

In the past, there has been a great deal of research aimed at improving the quality of apples offered to consumers. However, a recent study by L. Y. Clayton (1966) indicates that too many homemakers are not satisfied with the apples they buy at the retail level. When asked if they had been disappointed with apples that they had bought during the past year, 28 percent said, "yes". Of those who were disappointed, 92 percent were disappointed because of apple condition, while only 27 percent were disappointed in the taste. Of this unacceptable fruit, 82 percent was purchased from supermarkets and grocery stores. Apple flesh firmness is one of the major determinants of apple condition. Decay, scald or other deterioration that develops after packing and inspection affect condition and not the grade of apples.

To this date, the industry has depended upon self-discipline by producers and shippers to control the condition of apples moving to market. This has allowed some producers to deliver poor quality fruit without suffering an economic loss reflecting the total loss in consumer satisfaction and industry revenue. But recently, producers have become aware of the fact that poor quality fruit slows apple sales by reducing the number of possible resales. They also

realize that it is in their interest to insure the delivery of a top quality product to the market.

This has led to a growing realization that current grading procedures are not adequate since they do not assure consumers or retailers that the apples they buy are of acceptable quality. For this reason, there has been a strong movement within the industry to make condition a part of grade or to require a condition rating along with the current grading system. The primary reason this has not already come into effect is that too little is known about apple condition at various levels in the distribution channel and how condition can be inexpensively measured when the fruit is graded. Also, there is not enough information available about how long it takes an apple to move through the current market channels and therefore, it is not known just how good an apple has to be when it leaves the packing house to be of high quality when it finally reaches the consumer.

An internal quality analyzer, that is nondestructive of fruit, is being tested to help to determine the shelf life of fruit when it passes through the packing line. When the internal quality analyzer is ready for commercial use, the apple industry may be better able to set a meaningful quality standard for fresh fruit. At the present time, standards can be set on the basis of minimum firmness levels as measured by a fruit pressure tester.

Objectives

The main objective of this research project was to determine how long apples remain on the retailers' shelf. Additional variables of interest to the research team in this study were as follows:

(a) the condition of apples at the retail level, (b) what are the loss rates of apples at the present time, (c) how does condition effect apple sales, and (d) what is the general attitude of produce managers toward apple condition at the retail level?

The secondary objective of the study was to observe and analyse apple merchandising practices at the retail level. This objective was generated by the fact that per capita consumption of fresh apples has been on the decline over the past decade, even though consumers' incomes have been rising. The primary reasons given for this decline are that the produce department and the apple industry do not offer the consistent quality offered by other departments in a modern supermarket and that the produce department charges higher prices because of higher labor requirements, capital requirements, and spoilage rates. Since apples are an important part of the sales of any produce department throughout most of the year, the apple producer needs to be concerned about what is happening at the retail level concerning apple quality, movement, and marketing practices. Information concerning these factors should be useful to growers, packers, and retailers in helping increase apple sales.

Since the present study covers a small geographical area and a short time period, many of its results are tentative and necessarily

general. However, the results of this study provide new information concerning movement of apples in retail stores, and should also contribute to the formulation of objectives, study designs, and selection of methods for future studies that may be of value to the apple industry.

CHAPTER II

REVIEW OF LITERATURE

Considerable research has been done concerning the merchandising practices, movement, and quality of apples at the retail level. Related publications which were felt to be of interest in relationship to this study are reviewed below.

Henderson and Brown (1959), former agricultural economists at Virginia Polytechnic Institute, conducted a study to (a) determine whether it was feasible to measure week-to-week changes in the wholesale and retail movement of apples, and (b) ascertain the most appropriate technique for accomplishing this task from the standpoint of cost, value of data, accuracy, and timeliness. The study group included a probability sample of 612 food stores representing 8,500 outlets covering the Philadelphia and Chicago areas.

Weekly movements were determined for all major apple varieties in each store in the sample by standard accounting methods including an audit of current stocks. Data were also gathered concerning inventories, receipts, waste, and returns. Retail movement was then compared with apple movement into the marketing area to determine weekly wholesale apple holdings. Henderson and Brown were particularly interested in the weekly change in holdings at the wholesale level and how it effected demand and price at the

producers' level. The investigators found that the week-to-week movement of apples at the wholesale level varied greatly and had a significant effect on apple prices.

They recommended that the best way to estimate current wholesale apple holdings was to tabulate weekly receipts by retail outlets in a probability sample of key markets throughout the country, since receipts were very highly correlated with apple movement. This new information could then be combined with existing data to determine the quantity held by wholesalers. They felt that this data could be economically obtained and that it would provide useful information to improve the flow of fresh apples to market. However, there has been no effort since that time to provide such a service for the grower.

Although their study was not concerned with apple condition, it established a method for determining the time that apples spent between the shipper and the retail store. The study indicated that if shippers could cut back shipments when there was a build up of apples between them and the final consumer, they could expect a more uniform price. This would have an additional effect of reducing spoilage and handling costs. This could be accomplished by monitoring the unloading of apples and movement at the retail levels in key markets throughout the country.

An analysis of retail movement data indicated that apple shipments vary about 40 percent above and below actual apple sales. This reflects the change in apple holding between the two levels.

Significant changes in movement from week-to-week ranged from 0 to 20 percent. Changes ranging between 15 and 20 percent occurred during the one week periods preceding and following Thanksgiving and Christmas, and during the first and second weeks of January. Other weekly changes in movement, during the period studied, were between 0 and 12 percent.

Sheriden (1969) conducted a consumer survey in Kingston, Ohio. He found that while apple price was an important factor in influencing the housewife to buy, quality determines whether or not she will buy a second time. The investigator found that the housewife's major complaint was with prepackaging of fruits and vegetables. The housewives who were interviewed felt that poor quality was due to marketing practices or packaging material. The investigator stated that if the industry does not control the quality of its product that per capita consumption will continue to decline. He felt that individual producers will find it in their own self-interest to produce a quality product and will find it easier to sell their fruit at a higher price, resulting in greater profits. The investigator also stated that a producer who sells poor quality fruit will soon be out of business. Sheriden concluded that growers should be concerned with advertising, promotion, and quality, but that the greatest of these is quality.

Clayton (1966) conducted a nationwide survey to determine homemakers' use and opinion of a variety of fresh fruits. A probability sample of housewives chosen to be representative of U.S.

households were given a questionnaire. Homemakers were also asked to select from a list of both positive and negative statements the ones they felt were especially true about each fruit. Consumers were then asked what they thought the store manager could do to increase the purchase of fresh fruit.

The investigator found that apples were rated very high by homemakers. They received the highest scores on positive statements and the lowest scores on negative statements. Of those questioned, 93 percent felt that apples were good for health and 91 percent stated that they were good for snacks and packed lunches. This is impressive when compared to the second highest scorer, bananas, which scored 75 percent and 79 percent respectively. However, 18 percent of those questioned stated that apples were often bruised and 5 percent stated that they spoiled easily.

Apples were found to be the second most popular fruit behind bananas with 94 percent of homemakers indicating they had purchased apples in the last year. Apples were used mainly for snacks, salads, and packed lunches. When asked what they looked for in fresh apples to be eaten raw, most homemakers wanted apples that were red, juicy, unblemished, not bruised, medium size, firm but not hard, sweet, and of the Delicious variety. The investigator found that most homemakers (75 percent) prefer to purchase unpackaged or loose fresh fruit. Of the homemakers questioned, 41 percent stated that they purchased more fruit in the past year than they had been purchasing five years ago, while only 14 percent stated they were

purchasing less. The homemakers stated that most apples were purchased in the fall and winter seasons.

When the homemakers were asked what could be done to increase the sale of fresh fruit, 60 percent stated that high quality fruit and attractive displays were the most important factor in getting the customer to buy more fruit. Of homemakers who purchased some substitute fruit when they wanted apples, twice as many did so because of the apple's appearance than because of high apple prices. The results of this study indicate that while apples enjoy a great deal of popularity, there is a substantial need to improve the quality of the fruit that reaches the consumer and that such improvements will result in increased sales.

In an earlier study, between January 24th and March 7th of 1949, the U.S. Department of Agriculture (1950) conducted a survey to determine consumers preference for apples. A sample of 2,573 homemakers representing 42 million U.S. households was randomly sampled and interviewed. Typical questions were "When you buy eating apples how do you like them to look?" and "Do you prefer a sweet or a tart apple for cooking?". The major findings were that one out of three persons preferred apples to other fruit and 90 percent of those interviewed had purchased apples from the 1948 crop. Homemakers preferred apples because of their taste, usefulness, versatility, and for health reasons.

Thompson (1957) attempted to determine consumers' preference for apples in the Virginia area. The first part of the study

included a consumer survey pertaining to consumers' preference for apples and apple products. It was conducted in four Virginia and North Carolina cities. During 1956 he conducted a controlled experiment on apple size in six retail supermarkets in the Roanoke, Virginia area. This included an interview of apple purchasers at the time of the experiment.

The author's first survey indicated that there was a highly significant difference in the preference of consumers in different cities for apples and apple products, that consumers in different income groups and occupations had different apple preferences, and that variance was greater among Whites than among Blacks. He noted that differences among income and occupational groups were highly related, since occupational groups tended to have similar incomes. The controlled experiment indicated that there was no significant difference in consumer acceptance of apple sizes. The results of the second interview revealed lack of consumer knowledge about apple variety, size, and use among homemakers.

A review of the relevant research revealed no attempt to determine below what pressure an apple is unacceptable to consumers or at what pressure apples should be shipped to insure that they will reach the market in satisfactory condition. However, guide lines have been offered by specialists in this area, including Smock (1958) and Mattus and Rollins (1963). Smock found that varieties differ widely in their inherent rate of ripening and that the McIntosh variety had a higher ripening rate. At 74° F., McIntosh lost about

1 pound of pressure every three days until they reached a level of 10 pounds after which they lost 1 pound every two days.

Smock offered some guide lines as to the minimum firmness levels for various varieties to be sold on the fresh market. These are listed in Table 1. Smock also lists pressure at which apples are "unmarketable". He indicates that fruit in this condition is too soft to be eaten fresh. He does not give a guide line for all varieties, but feels that McIntosh should reach the consumer when they are no softer than 9 pounds pressure and preferably sooner. McIntosh are "unmarketable" at 7 to 8 pounds firmness.

In an article on testing apple firmness, Mattus and Rollins indicate the need for proper testing of apples while in storage to minimize losses due to overripening and breakdown in the market and at home. They state that the best indicator of potential storage life of an apple is its flesh firmness and that while the pressure tester is a valuable tool, the grower must consider other disorders such as scald, water core, bitter pit, decay, and shriveling that may occur even with acceptable flesh firmness. They indicate that these problems should be minimized by proper treatment and handling of fruit. They also stated growers of Virginia apples should market their apples before they soften to 13 pounds firmness for Winesap and York, 12 pounds for Delicious, Rome, and Stayman, and 11 pounds for Golden Delicious and Johnathan. They conclude by stating that "the production of quality fruit is important, but unless that high quality apple can be marketed in good condition, it is of little value."

TABLE 1

DETERMINATION OF FRUIT CONDITION WITH THE PRESSURE TESTER

Variety	Firmness when harvested	Firmness when "prime" or "firm ripe"	Should be sold before reaching	Unmarketable
	pounds	pounds	pounds	pounds
Duchess	17 to 19	11 to 14	11	7 to 9
Wealthy	14 to 16	11 to 14	10	7 to 8
McIntosh	14 to 16	11 to 12	10	7 to 8
Cortland	16 to 18	12 to 13	10	8 to 9
Delicious	17 to 18	12 to 15	11 to 12	8 to 10
Golden Delicious	18 to 20	13 to 16	12	8 to 10
Jonathan	16 to 19	11 to 14	11	8 to 10
Rhode Island Greening ...	21 to 24	14 to 16	13	10
Baldwin	22 to 24	13 to 14	12	10
Northern Spy	19 to 22	13 to 17	12	10
Rome Beauty	19 to 21	13 to 17	12 to 13	10

Source: R. M. Smock, The Storage of Apples, Cornell Extension Bulletin 440, (New York State College of Agriculture, May, 1958), Table 4, p. 39.

Cole and Lord (1962) conducted a case study of 18 grower-to-retailer store marketing operations in Massachusetts. Their primary interest was in the methods used by growers to sell apples directly to retail outlets. The investigators were also interested in an analysis of apple quality to obtain additional data which they felt might increase the effectiveness of selling apples through retail outlets.

The most common consumer unit packages were three-pound and four-pound polyethylene bags. Master cartons holding nine to twelve bags were most commonly used in shipping. The authors found that apples leaving the packing house had an average flesh firmness of 10.7 pounds with a low of 9.1 and a high of 12.5 pounds. There was no significant relationship between the grade of the fruit and the firmness of the flesh. Apples on display were often out of condition and Cole and Lord recommended the use of some type of dating system to denote packing dates, and the dating of cartons. They found an average flesh firmness of 10.6 pounds for apples on display in the stores.

The investigators also noted that larger apples tended to be softer under similar conditions while apples of higher grade were 0.4 to 0.8 pounds firmer than those of lower grade. Firmness was found to have a direct relationship to sales and apples deteriorated very quickly at room temperature. The investigators recommended that apples be kept on refrigerated display sections and that they should not be piled too high, since apples on the top would receive

little benefit from the cooling system. They found that large apples packaged in polyethylene bags are more easily bruised than smaller apples.

Store margins were from 8.8 percent to 33 percent in the 1959-60 period depending on the degree of service provided by the producers. Retail store managers suggested that producers could use inserts (a) to give suggestions on care and use of apples, (b) as a place to stamp the packing date and for recipes and other promotion and advertising materials. They also found that a great deal of injury occurred on apples within the store caused by store personnel and customers. Store managers tended to overbuy in periods of special sales or holidays, resulting in heavy carryovers.

In their final conclusion on apple condition, Cole and Lord state that the apple industry must face up to the fact that approximately 50 percent of the apples on retail counters were not of acceptable quality.

Baldsaro (1959) conducted a study of 41 stores in the Springfield, Massachusetts and Hartford, Connecticut market area for four weeks to determine how apples were sold in the Northeast and what could be done to improve apple movement at the retail level. Each week of the study, personal observations were made in the produce department of each store. On the second week of the study, an interview was held with the produce manager in each store. The investigator found that about 40 percent of the apples offered for sale were on refrigerated counters and that large stores tended to

have less refrigeration. Most large operators felt they were doing a good job moving apples, while managers of smaller stores felt their movement was only fair. Baldsaro concluded from this that small retailers would be more responsive to suggestions and willing to try new techniques. When the produce managers were asked what their three largest sellers were, excluding apples, they most often mentioned oranges with bananas, pears, and grapes following in that order. When asked in what condition they received their apples, 9 replied "excellent" and 30 replied "good" or "fair". The produce department managers chose the three-pound bag as the most popular one.

Several studies have been conducted to determine the degree of bruising which occurs during the transportation of apples (Burt, 1959; Ceponis and Ringel, 1963; Ceponis and Kaufman, 1964; Perkins, 1961; Schomer, 1957). All of these studies indicate that the majority of bruises over one-half inch in size are due to mechanical injury before they are packed or occur at the retail level. The results of these studies also indicate that cell cartons give apples the most protection followed by prepackaged trays, overwraps, and polyethylene bags respectively.

CHAPTER III

METHODOLOGY

Design

This study was designed to obtain an estimate of the shelf life which apples must have to reach the consumer in acceptable quality. In addition to this specific objective, observations were made of retail practices that might effect the quality of fruit reaching the consumer and variables which affect the shelf life requirements of apples.

Selection of Stores

The stores selected for the present study were located within Southwest Virginia. These stores were selected because of their accessibility to the research team. Limitations on available funds, personnel, and time did not allow the coverage of a larger area. It was hoped that other areas could be sampled at a later date.

Stores selected were chain type stores and were selected because they best represent the type of outlets through which most retail apple sales are made. Although the stores were all of the chain type, the size of town in which they were located varied in population from 5,000 to 90,000. Included in this study was a store that drew a large part of its clientele from a rural area and two stores that served a college campus area. It was assumed that

this sample would be representative of the area of interest. However, as with all samples of this type, there might be sampling bias if the stores in this area are not representative of those in the target area.

Procedure

Permission was received from the regional chain warehouse managers to conduct the study in their stores. Each store manager was then contacted by the regional office and was asked by them to cooperate with the study in every way. Each store was visited by the research team about two weeks before the team began working in the store. The store personnel were informed of the general procedure which would be followed during the period of research. All store managers that were contacted agreed to give their full cooperation during the study and an effort was made by the research team to obtain and maintain a good relationship with store personnel.

Movement within each store was observed for a minimum two-week period between March and May of 1972. Apples in bags and overwraps in the store at the beginning of the study were color coded, and each new lot of apples was coded to correspond to its arrival date when it entered the store. Loose apples were also coded by clipping stems to various lengths and color coding stem tips. A sample work sheet is shown in Appendix A. The research team believes that the coding methods were not observed or had no meaning to the consumers.

Each morning before the store was open to consumers, apples remaining on display were counted and tabulated according to their color code. Each day's count was subtracted from the previous day's count to obtain daily movement. Apples were replaced in the sale area according to the managers' stated preference of fresh lots on the bottom and older lots on the top. It was emphasized that store personnel should not change their routine, because of the current research project. All apples which were defined as bad by the produce personnel were removed from the sale area and recorded appropriately by the research team.

A random sample was taken from apple lots that entered the stores and was also taken of apples which had been on display for different intervals of time. The store from which the sample was taken, the date when the sample was taken, the grower and grade, the variety, the date when displayed, the days on display, whether it was bag or loose, and the number of apples in the sample were recorded. Later, the apples were sized and graded as to appearance on a scale from 1 to 5 (poor to good) with appearance ratings based on finish, color, shape, and defects. An estimate was made of percent red color and percent ground color. The percent of rot, breakdown, bitter pit, and scald were recorded. Average firmness and the average number of bruises were determined for each lot. Each lot was also rated on flesh color, astringency, taste, and ripeness.

Average days on display was later calculated for stores, variety, and form of sale (bag, loose, or overwrap) for all lots in the study. The data obtained in this manner were graphed and calculations were made to determine significant intervals. Calculations were also made to determine the volume of apples on display each day according to form of sale and this was later compared with movement that day.

Observations were made in the store concerning packaging, handling practices, and other variables that might influence apple quality or sales. During the two week period, measurements were made of space allocation in the produce department. Toward the end of this two week period or soon thereafter, each produce manager was interviewed regarding apple movement and selling practices within his store. Questions were asked concerning container suitability, merchandising practices, advertising, promotion, and pricing procedures. A sample questionnaire is included in Appendix B.

Ordinary least squares analysis¹ was used to test for significant relationships among the following variables:

X_1 to X_6 = store 1, 2, 3, ...6

X_7 = Red Delicious

X_8 = Golden Delicious

X_9 = Winesap

¹The author used William J. Raduckel's Regression Analysis Program for Economists. Reference Manual: Technical Paper No. 7, Harvard Institute of Economic Research, Harvard University, Cambridge, Massachusetts, November, 1970.

X_{10} = "other" varieties

X_{11} = days on display

X_{12} = bags

X_{13} = loose

X_{14} = average size

X_{15} = appearance

X_{16} = firmness

X_{17} = average number of bruises

Variables X_1 through X_{10} and X_{12} and X_{13} were 0, 1 variables while X_{11} and X_{14} through X_{17} were treated as continuous variables. The effect of variables, X_6 , X_{10} , and X_{13} are included in the intercepts of the estimated equations. X_1 through X_{14} were considered to be independent variables while X_{15} through X_{17} were considered dependent variables. A total of 58 observations were taken, however, 12 were not used in the final analysis, because of missing observations. The data used in the regression analysis is contained in Appendix C.

CHAPTER IV

ANALYSIS OF RETAIL APPLE MOVEMENT

Days on Display

To determine the quality which an apple must have to reach its ultimate consumer in satisfactory condition, it is necessary to estimate the days which it will remain on the retail store shelves. However, it is clear that not all apples will remain on display an equal length of time. Some will be purchased during the first day they are displayed while others may not be purchased for a considerable length of time. For this reason, the average number of days that an apple is on display may not be of major interest. A more relevant figure may be how long will it take to move 95 percent or 99 percent of the apples. Figures 1, 2, and 3 illustrate the percent of apples placed on display which still remained on display after a given number of days for bagged, loose, and overwrapped apples respectively. The figures used are the sum over all stores during the study period. For example, had 100 pounds of bagged apples been placed on display in a typical store during the study period, we would expect 30 percent of them or 30 pounds to still be on display three full days after they were placed in the sales area of the store. At the end of seven days, 5 percent or 5 pounds of the 100 pounds placed on

display seven days earlier would still be on display. Thus, from the results presented in Figures 1, 2, and 3 the minimum number of days required to sell a given percent of a lot of apples can be determined.

Bags

Of bagged apples on display in all the stores, 95 percent were moved within seven days; 99 percent were moved within nine days while some bags were sold only after thirteen days on display (Figure 1). Half of the bagged apples were moved when they had been displayed for about two days, and 30 percent were still on display after three days. One store required nine days to move 95 percent while another store moved 95 percent in five days. This variation occurred primarily because the store that moved 95 percent of its stock after it had been displayed for only five days had a much higher sales volume and was able to maintain a "full" looking display with a small display in relation to its total sales. If displayed at the volumes found in this study bagged apples must have high enough pressure to withstand a minimum of seven days at room temperature within the sales area in order to reach the consumer in good condition.

Bagged apple sales tended to be relatively constant over time as a percentage of what was on display. That is, there was no noted tendency for bags to move more slowly after they had been on display for a few days. It would seem that the poorer appearance of the bags as they sat on the retail shelf was made up for by the fact

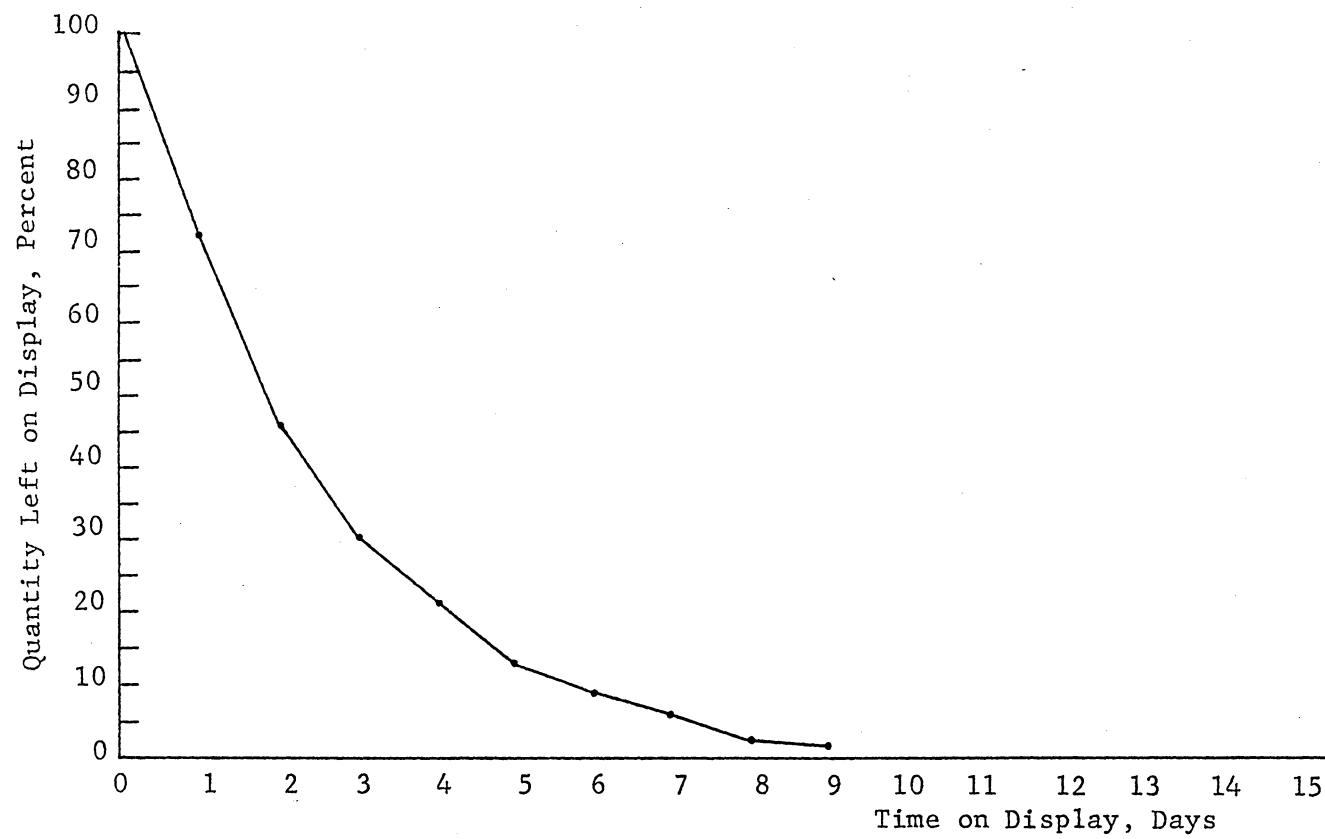


Fig. 1.--Average Disappearance Rate of Bagged Apples

older bags were placed toward the top of the display where they were better exposed to consumers. However, this is probably not the usual case, since a perfect rotation was maintained by the research team which would not have been done by store personnel. This indicates that sales of older bags would take longer under normal conditions.

Loose

Eight days were required to move 95 percent of the loose apples with 99 percent being moved in twelve days and half being moved in three days (Figure 2). There was considerable variation between stores in the number of days required to move 95 percent of loose apples displayed with a high of twelve days and a low of four days. Apples that were displayed loose required only about one more day to move 95 percent than those displayed in bags, even though their sales volume was quite small. This was because displays of loose apples were small in volume in comparison with the volume of bagged apple displayed. Store personnel tended to restock loose and overwrap displays less often than bags. This was done in loose displays to reduce the chance of older apples being covered by new stock. Loose apples were placed on refrigerated racks in all but one store.

Overwraps

Overwraps required about ten days to move 90 percent and fifteen days to move 99 percent. Half were moved before they were

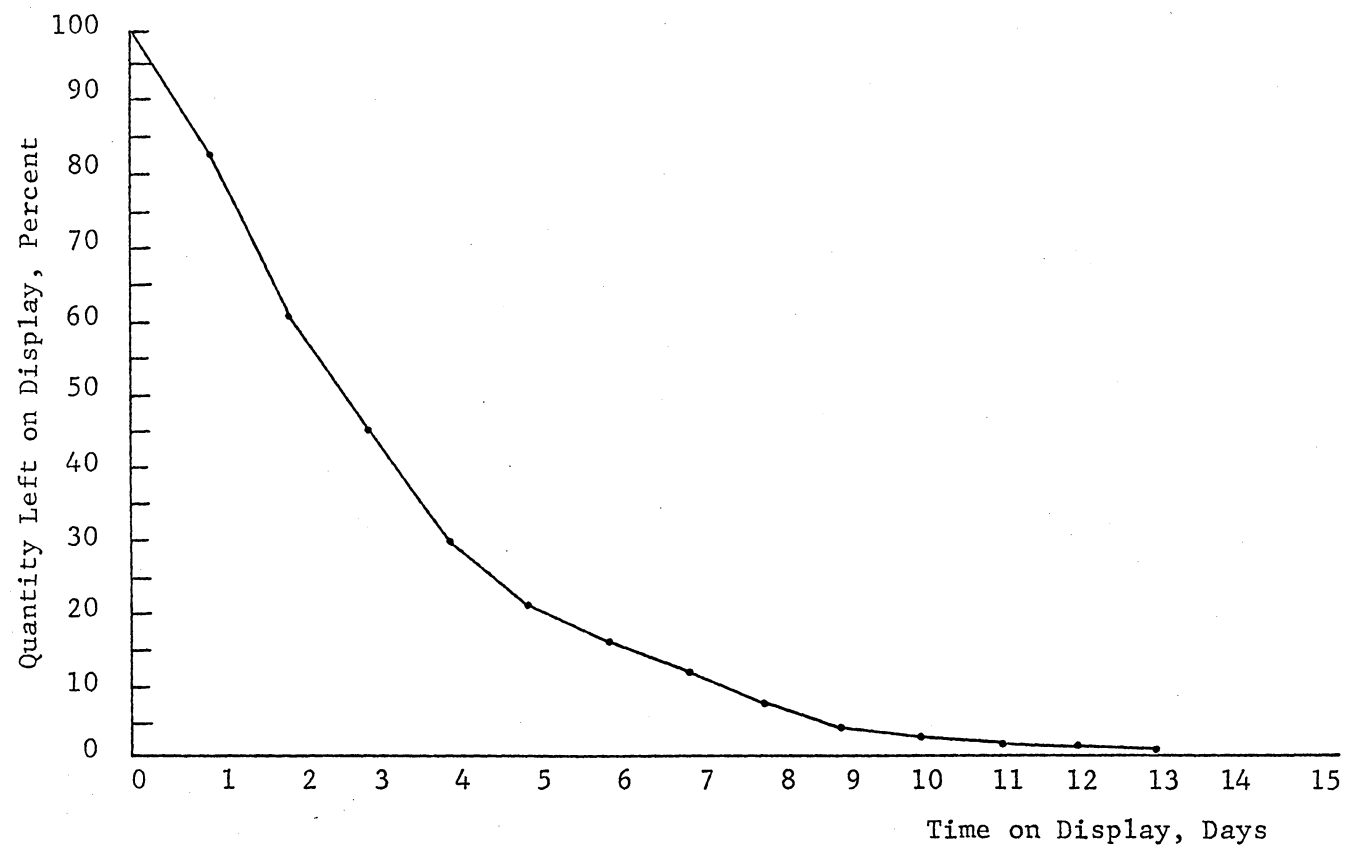


Fig. 2.--Average Disappearance Rate of Loose Apples

displayed four full days (Figure 3). The difference between days on display for bags and overwraps was about three days. In terms of setting quality standards this difference is not significant, since loose and overwrapped apples are held on refrigerated racks while bagged apples are displayed mostly on nonrefrigerated aisle tables. Overwrapping of apples also tends to increase its shelf life by preventing water loss.

Variation in Daily Apple Sales

Figure 4 shows average pounds sold for all stores and all varieties by day for bags, loose, and overwraps. For example, on Wednesday 92.7, 11.5, and 8.5 pounds of bag, loose, and overwraps were sold in the average store in this study. The biggest sale day for bagged apples was Tuesdays. This occurred because four of the stores had their bonus stamp day on Tuesday. The greatest affect on sales of this bonus was upon bagged apples, with more loose and overwraps, sold on the weekend. This reflects the appeal of bagged apples to budget minded consumers who are drawn to the store by special offers. Figure 4 also illustrates the predominance of bags over loose and overwraps. Total sales of bags were 4.5 times sales of loose and overwraps combined, even though bags were a poor container in terms of their ability to protect fruit. One produce manager stated that sales of larger bags had increased greatly during the past few years, because consumers were trying to counteract increased prices by buying more economical packages. The poorest days for apple sales were Monday and Wednesday.

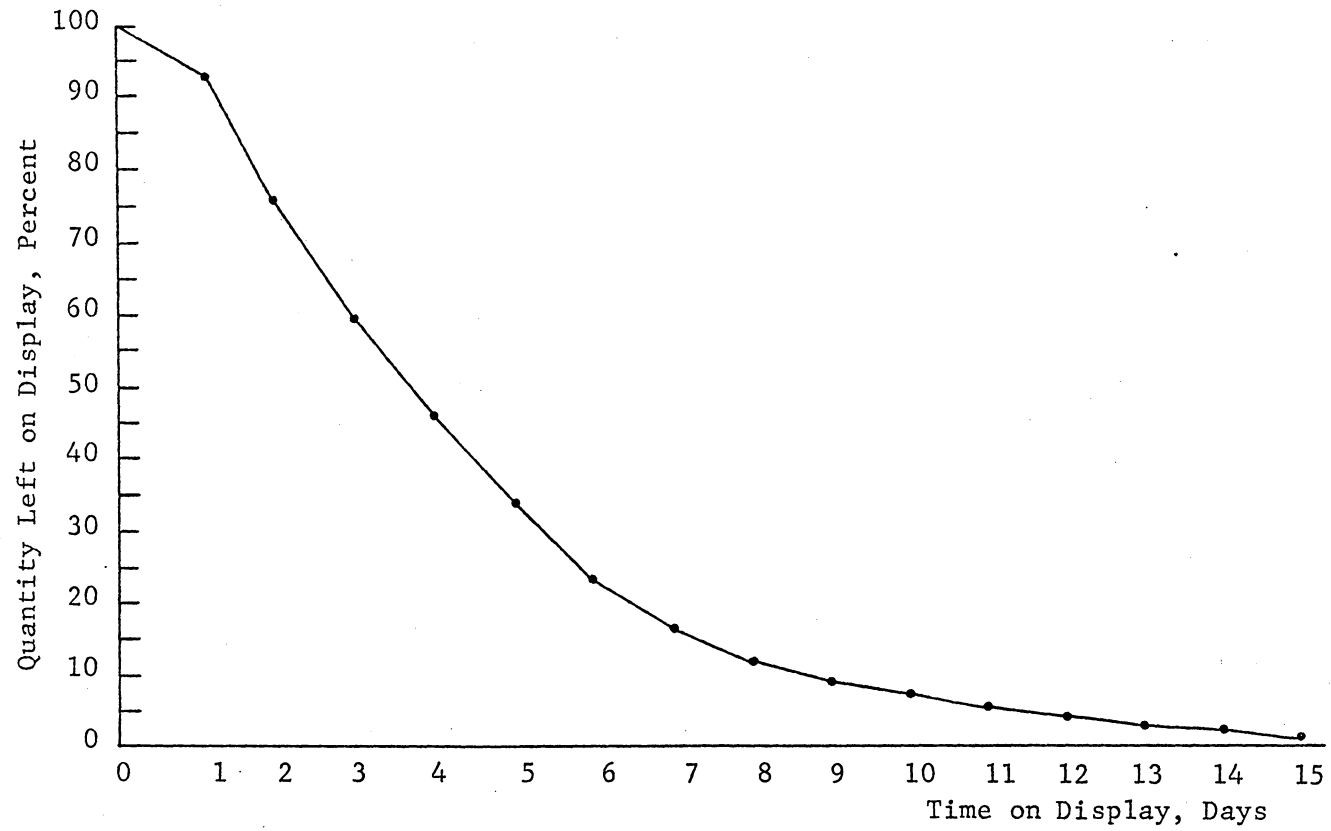


Fig. 3.--Average Disappearance Rate of Overwrapped Apples

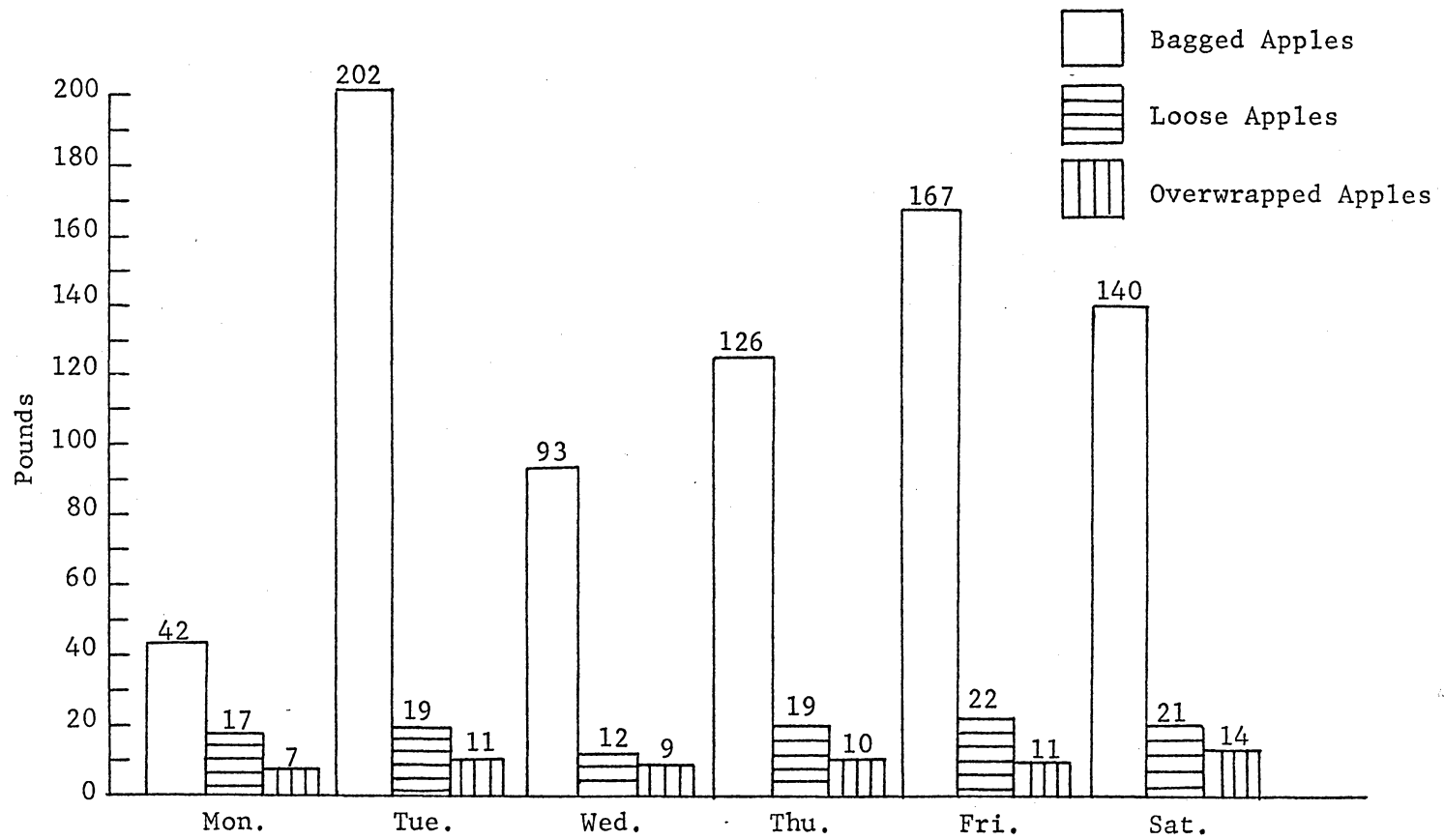


Fig. 4.--Average Sales of Bagged, Loose and Overwrapped Apples

Average Quantity Sold as Percentage
of Quantity Displayed

Since the number of days apples are on display has a significant effect upon the number of bruises, flesh firmness, and appearance, it would seem that an attempt should be made to reduce the amount of time that an apple remains in the display area. For this reason, it was decided to determine what the sales per day were as a percentage of the total quantity sold during the period of the study. In the study, the average display of bagged apples was 3.22 times as large as the average sales per day, loose displays were 4.59 times as large as average sale per day, and overwraps displays were 6.19 times as great.

The store with the lowest average display sales ratio had a ratio of 2, while the highest display sales ratio was 8. The store with the smallest display in relation to its sales of bagged apples had an average display twice the size of its average sales, while another store displayed five times the average daily sales. The store display sales ratios for loose and overwraps ranged from 4 to 11. The striking fact about this is the great amount of variation in the average display to sales ratio, both between stores and within stores in relation to the day of the week and to holidays. Produce managers did not seem to react well to changes in demand due to these variables. They would often put large quantities of apples on display on slow sales days, even though they should have known they would not have many sales. It was felt by the members of the research team that no more than a ratio of two to three was

necessary to build attractive displays and that a ratio greater than three tended to reduce sales. When a display to sales ratio greater than three was maintained some bags remained on display for too long a period and became unattractive, even though the apples could have been of reasonable eating quality. Since the longer held fruit was on top of fresher and more attractive fruit, it gave the total display a "tired" look. A ratio greater than two or three seems unnecessary since displays are restocked every morning and checked at least once more during the day, as stated by the produce managers.

The store with the largest volume display of bagged apples had the lowest display to sales ratios. It restricted its display to two layers. Its losses were lower because of this practice.

Figures 5, 6, and 7 illustrate the relationship between display size and daily sales for bags, loose, and overwraps respectively. Figure 5 shows that while sales were lowest on Mondays, store displays were built to a level almost equal to the average level over the week. Tuesdays had the greatest sale and greatest display size. It also had the greatest amount left at the end of the day. Figures 5, 6, and 7 also show that stores usually do not put apples on display on Saturdays, because they liked to reduce the amount of fruit that has to be left in the sales area on Sunday, since all stores in this study were closed on Sunday.

Figure 5 indicates that produce managers kept their ending daily balances around 300 pounds of bagged apples. Figure 6 illustrates the relationship between loose sales and display size on a

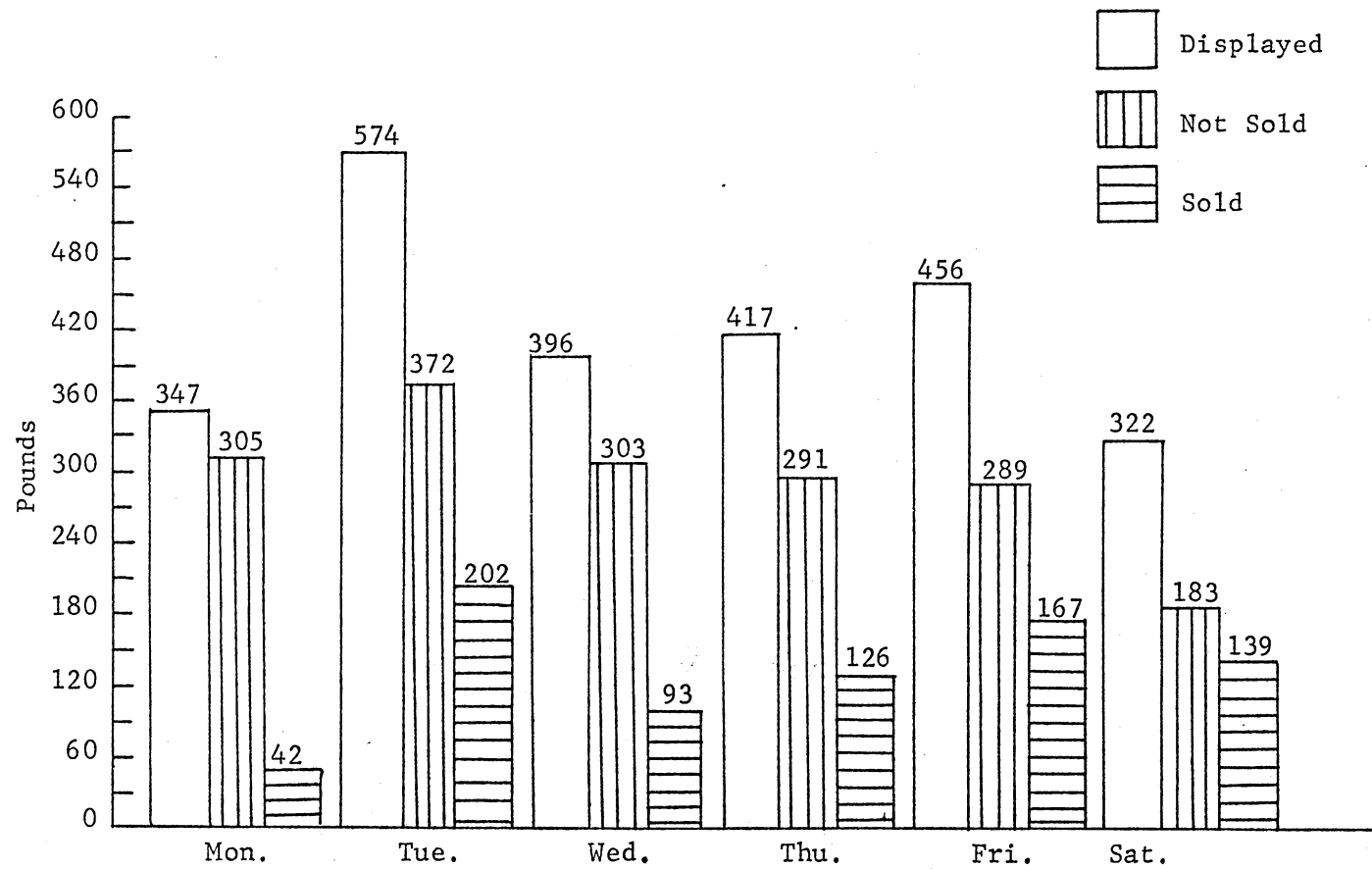


Fig. 5.--Average Bag Display Size Compared to Sales

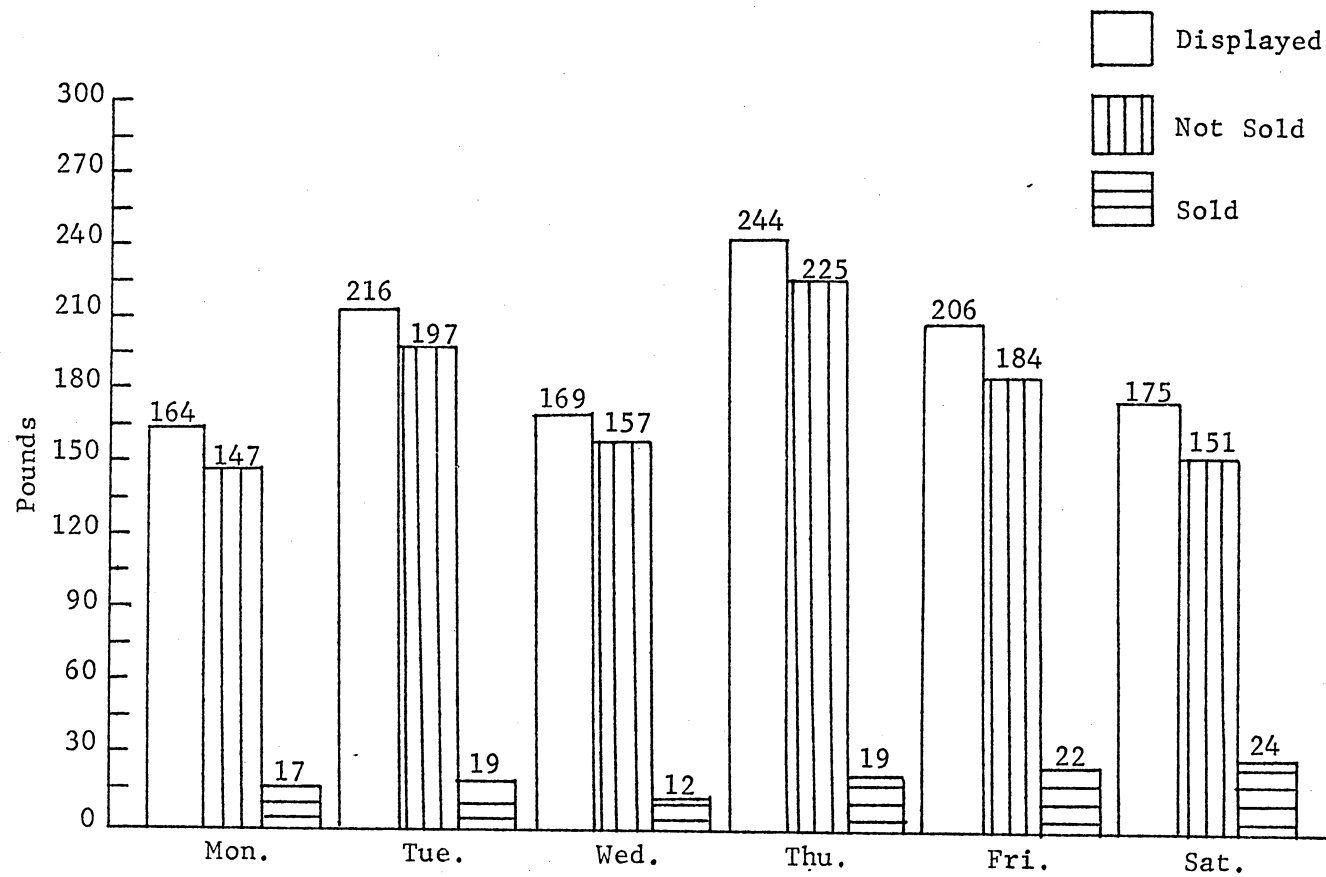


Fig. 6.--Average Loose Display Size Compared to Sales

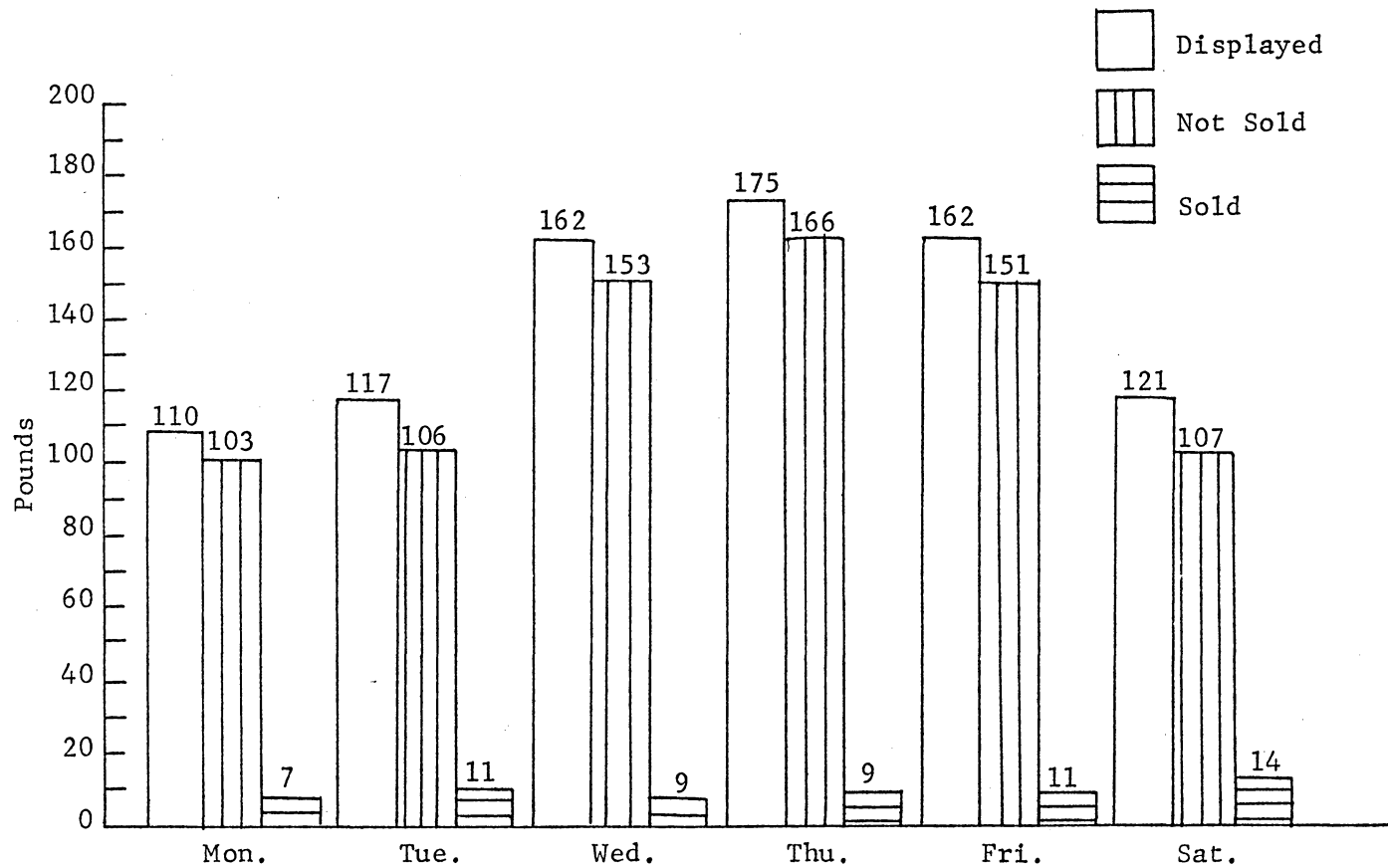


Fig. 7.--Average Overwrap Display Size Compared to Sales

pound basis. It indicates that most loose apples are placed on display on Tuesdays and Thursdays and stocks are allowed to decrease on other days. Figure 7 shows the relationship between sales and displays of overwraps. It indicates that most overwraps were placed on display on Wednesday. Figures 5 through 7 also indicate that apple displays could be reduced without produce managers running the risk of running out of merchandise during the day and that maintaining smaller displays would not increase labor costs by requiring frequent inspection of displays.

Spoilage

Spoilage was due to two factors; the quality of the fruit when it arrived in the store and the length of time it remained within the store. Most of the fruit that spoiled did so within seven days after it was placed on display and most of the losses occurred in poor quality lots. Most losses resulted from fruit arriving at the stores in poor condition rather than resulting from poor merchandising practices.

Spoilage of bagged apples over the total investigation was 3.2 percent. For loose it was 4.5 percent and for overwraps it was 4.9 percent. However, there was a great deal of variation between lots as to spoilage rates. One lot of three pound control atmosphere (CA) Stayman had a loss rate of 8.5 percent, while 52 percent of the lots of bagged apples had no spoilage at all. One store had losses on bagged apples of 8.6 percent, while the store with the lowest losses lost only 1 percent.

Losses on loose apples also ranged greatly between stores with a high of 18.1 percent and a low of 0.6 percent. Overwraps had a high loss of 22.9 percent for one store, while two stores suffered no loss of overwraps. The extremely high loss sustained by one store in overwraps was due to shriveling of Golden Delicious. This may have reduced sales. This will result in lower prices to all producers for all apples in the long run.

Store losses resulted from rot, internal breakdown, scald, bitter pit, bruising, and mechanical injuries. Not all losses would be eliminated if apples were of higher pressure, but spoilage of apples above minimum acceptable pressure would be much less than for apples under the acceptable pressure level.

Firmness

When ordinary least squares regression analysis was applied to the sample data, the following relationship was estimated for firmness:

$$\begin{aligned}
 X_{17} &= 23.14 - 1.48X_7 - 3.63X_8 + 2.86X_9 - 0.16X_{11} \\
 &\quad - 1.91X_{12} - 3.41X_{14} \\
 R^2 &= .66
 \end{aligned}$$

An R^2 of .66 indicates that 66 percent of the variation found in flesh firmness (X_{17}) can be explained by variety (X_7 = Red Delicious, X_8 = Golden Delicious, X_9 = Winesap), the number of days on display (X_{11}), form of sale (X_{12}), and size (X_{14}). Individual variables were significant at the $P \leq .10$ level. This means that

there is a 10 percent or less chance that the relationship detected by the model is due to chance.

The firmest apples were the Winesap with an estimated 4.3 pounds higher flesh pressure than that of Red Delicious. This is found by subtracting the coefficient of X_7 from that of X_9 . Golden Delicious was an estimated 2.2 pounds softer than was the Red Delicious. Apples in bags were estimated to be 1.9 pounds softer than loose apples from tray pack containers. This is partially explained by the fact that tray packed apples were held on refrigerated racks, while bagged apples were usually held on nonrefrigerated aisle displays.

Days on display was negatively related to firmness with apples losing an estimated .16 pounds pressure for each day they remained on display. This is surprisingly low and a significant gap exists between this estimate and the results of Smock's tests at 74° F. Some of this difference was expected since this estimate is for all apples held within the store both refrigerated and nonrefrigerated. In addition, several lots arrived at the store in ripe condition, therefore, they did not decline in pressure as rapidly as good condition apples would have under the same circumstances.

Apple size was estimated to be negatively related to firmness. The least squares estimate indicates that an apple $\frac{1}{2}$ inch above the average size had 1.7 pounds less pressure than an apple of normal size.

The study results indicate that it takes about 7 days for bags, 9 for loose, and 11 for overwraps to sell 95 percent of the apples from a given lot. Using what was estimated from our samples to be the rate of loss in pressure due to days on display of 0.16 pounds per day, an apple should be one to two pounds pressure higher when it enters the retail store than what is acceptable when it is purchased by the ultimate consumer. Again, using information obtained in the pressure test sample, about 40 percent of those apples sampled would not have met Smock's minimum standard when they entered the retail outlet. Fruit in poorer condition should have been marketed earlier before they fell below the minimum pressure requirements. This would not then reduce the total quantity of apples moving to market by forty percent, since some of these would be sold earlier in the season and some firmer apples would be held until later in the season. This would then have a tendency to decrease the price earlier in the season while increasing it later by placing a premium on higher quality apples that can remain in storage longer and still meet minimum standards. This would insure a higher quality product throughout the year and result in better returns for the industry as a whole.

Bruising

The following relationship was estimated for bruising using least squares regression analysis:

$$X_{18} = 0.73 + 0.60X_7 + 1.87X_8 + 1.40X_9 - 0.96X_{12}$$

$$R^2 = .34$$

Each individual variable was significant at the $P \leq .10$ level.

As noted earlier, the major part of bruising is done while apples are in the retail outlet. However, the regression analysis failed to reveal any significant difference among stores on the average number of bruises over $\frac{1}{2}$ inch in size per apple in the samples taken during the study at the 10 percent probability level. This indicates that while a great amount of bruising may occur in the retail stores, about the same amount of bruising occurred in each individual store included in this study.

There was, however, a significant difference in the number of bruises by variety. The most bruised variety was the Golden Delicious (X_7) with 1.3 more bruises per apple than the Red Delicious (X_8). Winesap apples (X_9) had an estimated 0.8 more bruises than did the Red Delicious. Bagged apples (X_{12}) had an estimated 1.0 more bruises per apple than did loose apples from tray pack containers.

Severe bruising occurred in the stores when apples fell off the displays onto the floor. Such bruising was very evident and apples with such severe bruising would not, if seen, be purchased by the consumer. This severe bruising occurred more frequently in the loose apple displays, less with bags, and seldom with overwrapped fruit.

Appearance

When least squares regression analysis was applied to the sample data, the following equation was estimated for appearance

(X_{16}):

$$X_{16} = 5.39 + 0.73X_1 + 0.83X_2 + 0.52X_3 - 0.51X_4 + 0.36X_5 \\ - 0.05X_{11} - 0.76X_{14} - 0.21X_{17} \\ R^2 = .56$$

Each variable was significant at the 10 percent level. While stores (variables X_1 through X_5) did not have a significant effect on bruising, they did have a significant effect on the appearance of apples in our sample. This probably reflects the ordering practices of the individual stores and the quality of apples they were able to obtain while the stores were being observed.

A significant negative relationship was detected between days on display (X_{11}) and appearance. The model estimated that for each day an apple is on display, its appearance rating drops by .05 points on a scale from 1 to 5. Size (X_{15}) and bruises (X_{18}) were also negatively related to appearance. The model estimated that the appearance rating was 0.76 points lower for apples 1 inch above average size than it was for apples of normal size. The model estimated that for each bruise acquired by an apple, its appearance rating dropped by 0.21 points.

CHAPTER V

RETAIL APPLE MERCHANDISING PRACTICES

Store Displays

Apples were well represented in the six stores in the survey, with an average of 38.2 square feet or 12.9 percent of the average produce department. Display space allocated to apples ranged from 28 to 51 square feet and from 9 to 20 percent of the produce department. Less display space was given to bananas (8.2 percent) than to apples; however, more area was allocated to citrus (14.6 percent) and "other fruits" (14.8 percent). Of the area allocated to apples, 65 percent was used to display bagged apples while loose apples and overwraps made up 24 percent and 11 percent respectively.

An average of 52 percent of the area allocated to apples was refrigerated, while 56 percent of the area allocated to both citrus and "other fruits" was refrigerated. All stores displayed apples in both refrigerated and nonrefrigerated areas. Bags were more often displayed in the nonrefrigerated area, while loose apples were refrigerated in all but one store and overwraps were always refrigerated.

The average square display footage of the produce departments was 297. This was equally allocated between fruits and vegetables. The total square footage ranged from 172 to 444. The

smallest produce department had the largest percentage of its display area allocated to apples (20 percent), while the largest produce department had near the average for all stores (12 percent). It appears that apples are an important part of the produce department and received good exposure in the stores observed in the study.

Although a considerable amount of space was allocated to apples, little point of purchase advertising or decoration was used in building displays. Typical point of purchase display material consisted of a small sign about 5 inches by 8 inches which stated the price of the apples and sometimes the variety or bag weights. Bagged apples were usually displayed on aisle tables while loose and overwrapped apples were found on refrigerated racks.

Displays were usually kept clean and neat; however, bad bags were sometimes left in the sales area and gave the display a "tired" look. It is impossible to know how many sales were lost because old bags reduced the eye appeal of displays. However, some time was spent by the research team in the stores during store hours and it would appear that lost sales for this reason could have been substantial. On one occasion a woman quickly walked away from an apple display after picking up a bag of apples with scald and a decayed apple in it. Apples that are out of condition should be removed from the display area as soon as it is apparent that they are of inferior quality. They may be thrown away or reduced in price. If reduced in price, they should be placed in a special area so they do not detract from the primary apple display.

Rotation

The most common type of display rotation observed was from back to front. Although the store managers stated that they preferred to rotate from bottom to top, this was not always possible because of the time required for this type of rotation. Often no real rotation was used in the higher volume stores and new fruit was placed on top of old fruit. This was particularly true where massive displays required considerable effort to be properly rotated.

Four of the stores in the study had a weekly coding system; however, it is doubtful that it was of much use in the rotation of stocks, since there was no way to distinguish between fruit that had been on display for eight days and that which had been displayed only one or two days. A coding system which had a maximum period of three days would seem more useful in the produce department, where freshness is quickly lost. Such a code could be put on the price label with either a color code, as was done by stores in the study, or a date or number code. This would allow produce managers to do a better job of rotating fruit. Proper rotation is important to minimize bruising and spoilage.

Produce managers could also do a better job if they would limit the height of their displays to two high. Larger displays greatly increase the time required to perform a proper rotation, since fruit cannot be moved around easily in higher displays and a greater number of packages must be inspected. Reducing display

volumes will improve sales, because older fruit will be moved first, resulting in higher overall quality of fruit.

Handling of Fruit

The majority of severe bruising occurs after apples enter the retail store. It is impossible to say how much of this damage is done by store employees and how much by customers. However, store personnel can minimize the bruising done by themselves and by customers. Maintaining similar sized displays with smaller volume will minimize bruising by produce people during inspection and rotation. Smaller displays will reduce the amount of sorting required by customers to locate a suitable bag. If poor quality fruit is removed from the display area when it becomes unacceptable, customers will be less skeptical of the fruit offered on display and will not feel it necessary to compare bags to find one of acceptable quality, thus, reducing customer handling and bruising.

The location of the produce department can be an important factor in determining bruises. To reduce bruising, customers should be exposed to the produce department after they have purchased heavier items such as canned foods and dairy products. This will minimize the bruising which occurs on the way to the check out counter. Three of the stores were set up such that customers entered the produce department first, while in three of the stores the produce department was the last department to which the consumer was exposed. When questioned why consumers were first exposed to the produce department, one produce manager stated that the store had

been set up in this way to increase produce sales, since customers tend to buy more of the products they are first exposed to. Produce clerks should be instructed on the proper handling of fragile products. They should be told not to drop apples or place heavy objects on top of them when filling grocery bags.

Bags

Bagged apples came in 3, 4, 8, and 10 pound bags. The most common was the three pound bag followed by 8, 4, and 10 pound bag in that order. All CA bagged apples were marketed in three-pound bags. Eights and tens were used more with cooking type apples such as York and Rome. All bags were clear polyethylene with printed labels which usually emphasized the brand name. Other identification was sometimes printed on the bag, on inserts, or on the twist which held the bag closed. All bags were marketed as 2½ inch minimum size, and as to variety, brand, and point of origin. Bags were usually placed on display in a horizontal position; however, the labels generally were printed vertically on the bag. This made it necessary for bags to be handled to bring the label in a proper orientation to be read. This extra handling could be avoided by printing the label on the bag in a horizontal position. One produce manager stacked his bags with the label side down. He stated that consumers were more interested in seeing the apples than the brand name. One other produce manager built his display with half of the labels up and half down to increase the exposure

of the consumers to the apple, but still used the eye appeal of the labels.

Loose and Overwraps

All overwraps were prepared within the store rather than in the regional warehouse. Overwraps were generally packed six apples to a package and were sometimes mixed with pears and/or oranges. Overwraps were placed on the refrigerated display racks, usually two packages deep. Loose apples were generally placed on refrigerated racks as well. It was noted that loose apples sometimes became bruised if they were placed directly on the racks and that trays or a foam rubber type padding was often used to prevent such abrasion. However, this padding tended to reduce the amount of cool air reaching apples, which raised their temperature and rate of deterioration. It is suggested a perforated rubber or plastic mat should be used which would reduce abrasion, but still allow the free flow of cool air around the fruit.

The racks on loose and overwrapped apples in most stores were slanted toward the consumers to give the display better eye appeal. However, some displays were slanted so much that when consumers selected apples from the lower end of these displays, apples above them sometimes rolled down the display and onto the floor. At other times racks were positioned so low that a large quantity of fruit was required to build an attractive display.

Arrivals

Apples were shipped from the regional chains to the stores in refrigerated or nonrefrigerated trucks. All stores received apples at least three days a week. In two of the stores, apples were placed directly in cold storage when they were unloaded at the store. Arrivals should be dated on one end of each box when they are placed in cold storage. This was the stated policy of the produce managers; however, it was not always followed. Apples arrived on pallets which were unloaded directly from the delivery vans by fork lifts. Usually, the produce managers were able to order the varieties and quantities of apples they desired. However, the produce managers were sometimes forced to take more of some items than they wanted, if the regional buyer had overpurchased that item. The produce managers received an order sheet stating size, variety, and selling price from which they made their selections. However, the produce managers had no control over the brand or grade of fruit they ordered. This list was revised when products were not available. The produce managers placed their orders about two days in advance of their arrivals. All fruit purchased was either U.S. Extra Fancy or U.S. Fancy. When fruit was repackaged, it was often down-graded to U.S. No. 1.

Stores tended to sell one brand until it was unavailable or out of condition and did not carry more than one brand of a given variety of bagged apples at a time. This could be because regional chains buy in large quantities to obtain quantity discounts or

because they do not want to take the risk of trying different brands, if they know one brand is of suitable quality. This suggests that while there is a low brand loyalty by consumers, a great deal of loyalty may be shown by the chain store buyers to a brand they can trust. This loyalty can only be maintained by a producer as long as he is able to deliver a quality product. It was observed by the research team that poor quality lots were quickly dropped by the chain. However, because of quantities already purchased, bad lots usually were received by the stores for about a week before the chain could secure a higher quality product from other sources for its individual stores. This resulted in high cost due to spoilage and lost sales.

Members of the research team visited four of the stores before, during, and after the Easter holidays. One of these stores displayed more apples before and during the holiday period with quite good results. The other stores visited drastically reduced their apple displays before and during the holiday period and had a corresponding reduction in sales. Later they increased their apple displays to their former level. During the holiday period, the apple displays were replaced by flower displays. In the store that emphasized apples, flowers were also emphasized. However, the flowers were placed on an aisle display which had been used for peanuts and after the Easter holiday this area was used for young plants to be set out in spring gardens. While it is not known how great the profit on flowers was, it is clear that apple sales could

have been substantial if apples had been available during the holiday period and properly promoted.

Pricing

The individual stores had no control over the pricing of fruit when it was placed on sale. Prices were listed on the order sheet so that produce managers knew the price of fruit when it was ordered. However, the produce managers did have the authority to mark down fruit that was in bad condition.

Bagged apple prices were given in terms of price per bag, rather than on a pound basis. Ten- and eight-pound bags sold at a considerably lower per pound basis and usually contained a cooking type apple. Four of the stores sold loose apples on a count basis while the other two stores sold them on a unit per pound basis. The stores which sold loose apples on a per pound basis had relatively more sales of loose apples. It could be that psychologically prices quoted on a per pound basis seemed more reasonable or that the type of customers who were attracted to these stores preferred loose apples. Overwraps were sold on a count basis by all stores.

Prices tended to be relatively steady throughout the period of the study and did not contain enough variation to estimate a price quantity relationship.

Promotion

Apple promotion by the retail stores was done through newspapers and point of purchase material. The stores themselves were

advertized by the regional chains over radio and television as well as through newspapers. Newspaper promotion of apples was relatively small, particularly when compared to the amount of display space given to them in the produce department. Usually, the newspaper advertisements simply read "apples, 3 lb., 69¢". Sometimes, this was accompanied by the word "special" and/or "a big red apple". This newspaper promotion was usually not associated with any price reduction during the period of the study.

Point of purchase material usually was limited to an eight by five card including variety, price, and weight information. The word "special" was sometimes placed on the top of the card which stated apple prices; however, this was not accompanied by a corresponding price reduction. There was no other point of purchase material used extensively by any of the management of the stores visited to improve the appearance of their displays.

CHAPTER VI

PRODUCE MANAGER SURVEY

The produce managers of the six stores in this study were asked to answer questions concerning their current practices and attitudes toward apples. Questions were asked in an informal session which lasted from thirty to sixty minutes. Questions were divided into five areas; container suitability, merchandising practices, advertising and promotion, pricing procedures, and a comparison of Eastern and Western apples. The results of this survey are presented below. A sample questionnaire is included in Appendix B.

Container Suitability

When asked if containers arrived in good condition, five of the six produce managers replied "yes". The sixth manager stated that 10 percent of bag masters arrived "beat up". When asked what was the most common cause of container breakdown, the managers answered "ran into with pallet", "weight on top", and "dampness from ice". When asked if different shaped containers created problems, four said "no" while two said "yes". One produce manager stated that odd sized boxes caused trouble with stacking, since they did not fit in with other boxes and got into the way. He also stated that long bag masters did not hold up well. When asked if

labeling on containers was adequate, five said "yes" and one said "no". Two stated it would help to have labeling on both ends and more legible marketing. This would aid in their inventory control and reduce mix-ups.

When asked what size of bag sold best in their store, the produce managers gave a wide variety of answers ranging from the three- to eight-pound bags. Five out of six produce managers indicated that printing on bags should emphasize the variety and not the brand of the producer, packer, or shipper. The printing should be attractive, but should not cover more than 30 percent of the surface to allow consumers to easily inspect the contents of the package. Inserts and twists should be used to carry only information which the customer is not interested in at the point of sale. Inserts could be used for recipes, proper handling messages, or general consumer education about apples.

The most consistent complaint concerning bagged apples was that labeling was not adequate. Several of the produce managers mentioned that they had to spend time identifying for customers the different varieties on display and the "best" uses for each variety.

All of the produce managers felt that overwraps were a slow mover, but that they would not be phased out because of their higher markup. They had no problems with overwraps and felt that apples probably looked and held up better when overwrapped.

When asked about current grading procedures, the general opinion was one of indifference. In general, they felt apple grades

were more of a hindrance than a help. They stated that customers did not care about grade and that they did not know what the grades meant themselves. One produce manager stated that he always marked apples down to U.S. No. 1 when he repacked them, so he would not have any problems with the state inspector. However, current grades do insure that apples which reach the chain stores have acceptable appearance and eye appeal. Managers also showed indifference between state and federal grades.

When questioned about using tray pack carton trays in displaying loose apples, all of the produce managers said they seldom used them. They stated that even though displays built using trays looked good at first, they were quickly torn apart by customers resulting in a bad appearance. They did use trays on the bottom of the display to prevent apples from rolling. They indicated that this practice gave them a good solid base upon which to build their display. When asked how they felt about the new plastic trays, half were indifferent to them while the other three preferred the fiber board type. The reasons given for disliking the plastic tray were that they "break and crack easily", "were too flimsy", and "increase bruising because apples are looser". When asked if they would be willing to repack plastic trays and send them back to the packer as part of a recycling program if the packer would pay the freight, they said "no". The reason given was that they did not have time to repack trays or room to store them. They felt it was easier to throw them away and did not think the program would work without some economic incentive to the chain store.

Merchandising Practices

All six managers stated they dated boxes when they arrived in the store, however, the research team observed that this was not always done. Four of the six stated they had an inventory system for bagged apples and that it was based on a color code. All five of those that carried overwraps had a dating system. Those that rewrapped overwraps placed a new date on the overwraps corresponding to the date it was rewrapped. There was no inventory control on loose apples after they were placed on display.

All those questioned stated they restocked their apple displays in the morning and throughout the day if apples were moving well. Three stated they rotated their displays from bottom to top while three stated their rotation procedure were from back to front. However, this was not always the practice observed in the stores and the quality of rotation seemed to be directly related to the amount of time the produce manager had to perform the rotation. Bags were removed according to appearance by all the managers. They also stated that they made a close inspection of the display at least twice a day. However, apples with poor appearance were often left on display for a considerable length of time, apparently unobserved by produce personnel.

When asked to estimate their losses, three estimated losses at about 1 percent while two estimated 2 to 3 percent. This is well below what was actually found during the March to May study period. The produce managers did not seem to be concerned with their rate of

loss. Perhaps this is because it is about equivalent to other fruits and vegetables in the produce department and is reflected in their markup.

Only one of the produce managers stated that he covered the refrigerated racks at night. The apples were left in the sale area at night by all the stores. On weekends, only one of the stores consistently placed apples from nonrefrigerated areas into their walkin coolers. This reduced their temperature for about thirty-six hours from Friday night until Monday morning. They all stated that they kept apples in cold storage until they were put on display; however, two of them were observed leaving apples in the nonrefrigerated preparation area. Both had relatively small cold storage rooms and perhaps needed the area for other items, however, this was not totally apparent. At times, apples remained in the preparation room unrefrigerated for two days before being placed on display. Estimated cooler temperature ranged from 38° F. to 55° F., while the produce managers set their selling area temperature at from 70° F. to 76° F. They thought the refrigerated racks were from 38° F. to 60° F. depending upon the type of display and other circumstances.

Advertising and Promotion

They all stated that they used point of purchase material and that it helped to build good displays. However, some material which arrived in the store during the study period was not used. They received their material from the regional chain office and from

various apple commissions. Advertising through the media was handled by the regional chain and was done through newspapers, radio, and television. When asked what type of advertising would best help the sale of apples, they recommended a use theme including recipes, preparation, and suggested uses for various varieties.

Space Allocation and Pricing Procedures

When asked how they allocated space, most managers said they considered price, movement, and availability of each product. When asked if they used past records when determining apple orders, only two said "yes". These two, who managed in the two largest produce departments, stated that records were very helpful to them, while the other four felt they were of no use.

All produce managers answered "yes" when asked if apples were a good money maker. The reason they gave was that there was good demand for apples of high quality and that apples required less labor than other products. When asked what the three best money makers were for their produce department, apples appeared in all cases. Bananas were listed first with apples and oranges evenly split between second and third. This is particularly interesting in light of the common belief that apples carry bananas. It may be that the produce managers looked at "best money maker" in a broader sense than just its profitability, but depended on bananas to draw people to their produce department. They all answered "yes" when asked if apples were used as a drawing card to the produce department and added that this was done mostly in the fall when

the new crop comes into the stores to get people started buying apples.

None of the produce managers had any control over price except to mark down apples when they "look bad". They stated that they were not allowed to purchase apples directly from growers or packers because of chain policy and the problem of establishing a grade on ungraded apples.

Eastern Versus Western Apples

The produce managers were asked to state their opinion as to the difference between Eastern and Western apples with respect to appearance, taste, and condition. All of the produce managers felt that Western apples had superior appearance. Three stated that Western apples had superior taste while one thought Eastern apples had superior taste and one was indifferent. Five of those interviewed felt Western apples had better condition while one did not know. They all stated that they had customers who wanted Eastern apples and those who preferred Western apples.

It should be noted that the results of this questionnaire were made up of only six observations and that produce managers were asked for their opinions and suggestions. However, it seemed from the questionnaire that produce managers felt that apples were an important part of their department and were relatively pleased with their quality and movement. Their major suggestion was that marketings on bagged apples should emphasize variety above brands and that inserts should be used for material that needs to be read

only after the bags are opened. They also emphasized the use of recipes and a use theme rather than trying to build brand loyalty through advertising.

CHAPTER VII

SUMMARY AND RECOMMENDATIONS

Over the past twenty years, members of the apple industry have improved the quality of their fresh product through better production, storage, and shipping methods. However, today there is still a great deal of concern in the industry about the quality of the product reaching the consumer. This has led to the suggestion that apple grades need to include a condition standard. It was felt that before such standards could be set, it would be necessary to conduct pilot studies to determine the current condition of apples on the retail shelf.

For this reason, this study of retail apple movement and sales was undertaken by a six men research team. Six retail stores in Southwest Virginia were studied for a minimum of 14 days each between March 3 and May 9 of 1972, during which time apple movements were recorded and other observations were made. During this period, each produce manager was interviewed concerning his opinions and suggestions concerning apple sales. Samples were also taken of apples that arrived in the store and least squares analysis was used to test selected variables to see if they significantly affect apple firmness, appearance, or bruising.

It took seven days to move 95 percent of bagged apples, about $8\frac{1}{2}$ days for loose and $10\frac{1}{2}$ days for overwraps. This indicates that if current merchandising practices continue, apples will have to be of sufficient quality to sustain a seven to ten day period on the grocer's shelf to reach the consumer in acceptable condition. Apples need to be two to three pounds above minimum acceptable pressure when they enter the store. Samples taken during the survey indicate that at least 40 percent of the apples arriving in the store would not have acceptable pressure at the end of a seven to ten day holding period.

The produce managers interviewed indicated that often they could not depend on current grading systems to insure that the apples they order would arrive in good condition. This study supported the literature that indicates consumers do not always receive apples which are in satisfactory condition and that they would purchase more fruit if it were of consistent high quality.

It is possible to reduce this seven to ten day holding period by reducing the number of apples on display without reducing sales. This could be accomplished by using fillers or platforms when building apple displays to reduce the volume of apple displays. The display area is important because at this point the consumer decides whether or not to purchase the product. Bags containing out of condition apples should be removed from the display area so they will not detract from the display. Apples left on display

when they are out of condition reduce the movement of all bags and if purchased reduce the possibility of resales. A rubber or plastic perforated mat should be placed under the displays to protect apples from abrasions and still permit free circulation of cool air.

Displays should be slanted to give the displays good eye appeal and a full look with a minimum number of bags. However, if displays are slopped too steeply, apples are likely to fall on the floor causing severe bruising.

Apple displays should be restricted to two deep. Display areas should not be used to store apples. They should be used only to exhibit merchandise. Stocking a quality product and removing "tired" bags will increase the turnover rate by improving the appearance of displays and increasing repeat sales. The produce manager should make an effort to minimize the length of time apples remain in the display area. Proper rotation is important to insure that some apples do not remain on display longer than necessary, because they are hidden from the consumer below newer stock. A coding system with a coding period no longer than three days should be used to improve rotation systems. A color, number, or dating code could be incorporated into the price label.

Apple displays should not be restocked to their normal size on days with slow apple sales. All apples should be displayed on refrigerated racks. When the store will be closed for one or more days, apples displayed on unrefrigerated aisle tables should be placed in the cooler.

The results of the study seem to support the existing view, as expressed in the literature, that price takes second place to quality when homemakers select fruit. However, some consumers are becoming more price and budget conscious as inflation continues. Apple sales could have been increased had more apples been available during the Easter holiday period.

Produce managers were generally satisfied with the apples they received and the way they were received. However, some odd sized boxes of bagged apples created problems for store personnel and did not protect fruit as well as did standard sized bag masters. Dating of boxes and bags could improve the handling and turnover of apples. This practice would allow an accurate tabulation of the time an apple spends in the distribution channel.

The polyethylene bag is very important to the apple industry. In this study, over 75 percent of the apples sold were sold in this form. About 70 percent of the surface area should be clear to allow easy inspection of the content of the bag. The printing should be attractive and informative. Labels should be printed horizontally, since bags are placed in a horizontal position in the sales area. At the point of purchase, consumers are most interested in the variety of the apples. The producer, packer or grower's name should be deemphasized so consumers can easily find the variety name. Inserts can be used to inform consumers about proper storage and use of apples. Inserts could also be used for recipes and the shipping date.

The overall results of the study seem to confirm the existing opinion within the industry that making condition a part of grade will greatly improve the quality of fruit reaching consumers and be good for the industry as a whole. However, the minimum acceptable quality at which apples should be allowed into the fresh market cannot be answered on the basis of this study alone. There is a need for more research to answer this question.

This study indicates that any condition standard set must be high enough that apples can withstand up to seven days of unrefrigerated display in the retail store if volume displayed is not reduced. The apple industry must face up to the fact that much of its product did not reach the consumer in good condition.

Condition standards should be set for all apples entering the fresh market. This study indicates that such standards will benefit both the consumer and the producer.

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Appendix A

SAMPLE WORK SHEET

SAMPLE WORK SHEET

Lot Identification		Virginia, Red Delicious, Glaize, 3 lb./69¢				Virginia, Rome, Bonham, 8 lb./99¢			
Date	Location	Sample or Bad	Color Code	Have	Sold	Sample or Bad	Color Code	Have	Sold
3/10	Arrival		Blue	36	0		Blue	50	0
	Cooler		Red	60	16 ^a				
	Table		Brown	8	3		White	55	8
	Table		Yellow	1	1		Green	33	9
	Table		Black	2	0		Yellow	6	4
3/11	Arrival		Green	36			Black	50	
	Cooler		Blue	36			Blue	50	
	Cooler		Red	36					
	Table		Black	2			Blue	0	
	Table		Red	8		1/0	White	46	
	Table	1/0 ^b	Brown	4			Green	24	
	Table		Yellow	0		0/1	Yellow	1	

^aProcedure for calculating quantity sold. On 3/11, there were 36 red bags in the cooler and 8 red bags on the table, therefore, 16 red bags were sold on 3/10 ($16 = 60 - 36 - 8$).

^bThe first number means 1 brown bag was taken as a sample. The second number gives the number of bags removed from the display because the apple(s) were out of condition.

Appendix B

PRODUCE MANAGER SURVEY

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

RETAIL APPLE MERCHANDISING PRACTICES AND PROBLEMS

Produce Manager Survey - Personal Interview

Firm Name _____ Interviewer _____

Firm Address _____ Interviewee _____

A. Container Suitability

1. Do containers arrive at the store in good condition?

a. Yes ____.

b. No _____. What percentage arrive in poor condition?

Tray pack _____ Bag masters _____

c. What is the most common problem in container breakdown?

1. Tray pack _____

2. Bag master _____

2. Do differently shaped containers create problems for you?

If yes, explain _____

3. Is labeling on containers adequate? _____ If no, explain ____

4. Which size of bagged apples seem to sell most quickly in
your store? _____

5. What problems do you have with bagged apples?

a. Labeling _____

b. Breaking (%) _____

c. Internal fogging _____

d. Bags loosely tied _____

- e. Bruising _____
- f. Other _____
- 6. Are your overwraps prepared locally or at the regional distribution office? _____ Why? _____
- 7. What problems do you encounter in preparing overwraps? _____

- 8. How often do you repack overwraps? _____
How do you decide when to repack? (Time, appearance) _____

How do you label the repacked overwraps? _____
- 9. What in your opinion is the future of overwraps for apples? _____

- 10. Is the current grading system for apples satisfactory? If no, explain _____
- 11. Would you prefer national grade standards instead of individual state grades? _____
- 12. Any other container problems _____

B. Merchandising practices

- 1. Do you have an inventory control procedure? Explain _____

- 2. When do you restock shelves? _____
- 3. What procedure do you follow in restocking shelves?
 - a. Bags _____
 - b. Loose _____
 - c. Overwraps _____

4. How frequently during the day do you inspect displays?
- _____
- a. What criterion do you use for removing apples from the display shelf? (Appearance, condition, time) _____
- _____
- b. What percentage of apples received are not sold to customers? _____
5. Do you display loose apples on trays? Why? _____
6. Are the new noncardboard trays an improvement over the older trays in terms of:
- a. reducing bruising _____
- b. building displays _____
7. Do you use color contrasts to improve appearance of displays?
- _____
8. Do you remove apples from sales area at night? _____
- If yes, explain _____
9. Do you cover apples on refrigeration rack at night? _____
10. Are your apples stored in a cooler in the preparation room?
- _____ If not, under what conditions are they held? _____
- _____
- Temperature inside cooler?
- Day _____
- Night _____

11. Temperature of sales area?

Day _____

Night _____

12. Temperature on refrigerated rack? _____

C. Advertising and promotion

1. Do you use point of purchase advertising material? _____

If no, why? _____

2. Source of advertising material? _____

3. Type of advertising material? _____

4. Is apple promotion material and availability of apples well coordinated? _____

5. What is your attitude concerning contests between produce managers within your chain to increase sales? _____

6. Do you have any ideas of advertising and promotion material that might help sell apples? _____

D. Pricing procedures

1. How do you determine space allocation within produce department?

a. Fruit vs. vegetable _____

b. Refrigeration vs. nonrefrigeration _____

c. Apples vs. other fruits _____

d. Do you use your own records of past sales during the last few days or weeks in determining space allocation?

e. Notes _____

2. Are apples a good money-maker in your produce department?

a. Reasons: _____

b. What are the three best money-makers among fruits in
your produce department?

First _____

Second _____

Third _____

3. Do you promote apples as a drawing card to the produce department? _____

4. How much control do you have over the pricing of apples?

5. Do you buy any local apples directly? _____ Why? _____

6. Do you have any comments concerning apples not covered in
the above questions? _____

7. How would you rate Eastern and Western apples on appearance,
taste, and condition? _____

Appendix C

DATA FOR REGRESSION ANALYSIS

DATA FOR REGRESSION ANALYSIS

Sample Number	Variety ^a	Days on Display	Bag Size (lbs.)	Loose Size (count)	Average Size (inches)	Appearance	Average Firmness (lbs.)	Average number bruises over ½ inch per apple
1	RD	0	3	-	2.7	3.6	11.9	3.2
2	W	0	4	-	2.3	3.5	15.6	4.7
3	W	0	4	-	2.4	3.7	14.9	4.8
4	RD	3	3	-	2.7	3.5	10.6	2.1
5	R	2	4	-	2.9	3.0	9.6	1.1
6	W	11	4	-	2.4	3.3	15.3	1.9
7	RD	0	3	-	2.5	3.9	14.7	0.8
8	RD	3	3	-	2.7	3.4	9.2	2.9
9	RD	19	-	138	2.7	-	9.6	2.1
10	R	1	4	-	2.9	-	10.5	2.6
11	W	3	4	-	2.5	-	15.7	1.0
12	RD	8	4	-	2.6	-	7.6	2.9
13	RD	3	3	-	2.6	-	8.6	3.6
14	RD	3	3	-	2.7	3.4	9.2	2.9
15	GD	8	-	113	2.7	2.5	9.0	5.3

(continued)

^aThe following abbreviations have been used for apple varieties: RD = Red Delicious, GD = Golden Delicious, R = Rome, S = Stayman, L = Lowery, Y = York, and W = Winesap.

DATA FOR REGRESSION ANALYSIS (Continued)

Sample Number	Variety ^a	Days on Display	Bag Size (lbs.)	Loose Size (count)	Average Size (inches)	Appearance	Average Firmness (lbs.)	Average number bruises over ½ inch per apple
16	RD	8	-	113	2.8	3.6	13.5	1.0
17	L	10	8	-	2.5	3.2	8.9	2.0
18	RD	15	-	113	2.8	3.0	9.8	2.9
19	GD	15	-	113	2.7	3.1	7.3	1.7
20	GD	1	3	-	2.5	3.1	9.3	5.3
21	Y	2	8	-	2.6	3.0	14.8	2.3
22	Y	3	8	-	2.6	2.8	13.8	1.9
23	R	7	4	-	3.0	3.1	9.5	1.5
24	R	5	3	-	2.7	3.5	13.8	0.2
25	W	6	3	-	2.3	3.2	11.6	2.3
26	GD	7	3	-	2.3	2.7	9.9	3.4
27	S	6	3	-	2.7	3.5	10.7	1.4
28	RD	17	-	88	2.8	2.6	9.9	1.0
29	GD	6	3	-	2.3	1.5	8.9	3.6
30	GD	4	3	-	2.4	1.5	8.4	3.1

(continued)

^aThe following abbreviations have been used for apple varieties: RD = Red Delicious, GD = Golden Delicious, R = Rome, S = Stayman, L = Lowery, Y = York, and W = Winesap.

DATA FOR REGRESSION ANALYSIS (Continued)

Sample Number	Variety ^a	Days on Display	Bag Size (lbs.)	Loose Size (count)	Average Size (inches)	Appearance	Average Firmness (lbs.)	Average number bruises over ½ inch per apple
31	GD	0	3	-	2.3	1.5	8.3	4.1
32	RD	0	3	-	2.6	3.8	11.9	1.5
33	GD	15	-	113	2.7	2.5	8.4	0.6
34	GD	0	-	88	3.0	4.0	9.4	0.9
35	RD	5	3	-	2.5	3.0	9.3	2.2
36	RD	3	3	-	2.4	2.7	10.6	1.2
37	RD	0	3	-	2.6	2.7	9.8	1.6
38	RD	0	-	88	3.1	3.3	11.3	0.8
39	RD	2	-	88	2.9	3.3	10.5	1.7
40	RD	2	-	88	3.1	3.8	9.1	0.7
41	RD	8	-	88	3.0	1.9	11.1	1.8
42	RD	0	-	113	2.8	3.4	11.7	1.2
43	R	4	-	72	3.3	1.3	10.7	1.2
44	R	0	3	-	2.6	3.6	11.7	0.5
45	RD	3	3	-	2.6	2.9	11.1	2.1
46	S	2	3	-	2.8	2.8	10.2	2.2

^aThe following abbreviations have been used for apple varieties: RD = Red Delicious, GD = Golden Delicious, R = Rome, S = Stayman, L = Lowery, Y = York, and W = Winesap.

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AN ANALYSIS OF RETAIL APPLE MARKETING

by

Phillip Michael Aust

(ABSTRACT)

In an attempt to provide a consistently high quality product to the consumer, the apple industry is currently considering making condition a part of grade. Information concerning apple movement at the retail level is needed to help determine where such standards should be set. To provide such information, a study of six stores located in Southwest Virginia was undertaken to determine how long apples remain in retail displays under current marketing practices. Observations were also made on marketing practices which affected the quality of fruit reaching the consumer.

Each store was studied for a minimum two week period. Current stocks and incoming lots were color coded and counted each day to determine the length of time apples remained on the retail shelf. Samples were taken of lots when they entered the store and after they had been on display. An oral interview was conducted with each of the produce managers.

The results indicate that 95 percent of bagged, loose, and overwrapped apples were sold within 7, 9, and 12 days respectively. Sales of bagged apples were 4 times that of overwraps and loose combined. The results of the produce managers' interviews indicated that they are usually satisfied with the product they are receiving.

The study indicates that the required shelf life of apples could be reduced through improved merchandising practices. The quality of apples reaching the consumer could be improved by making condition part of grade.