UNITED STATES DEPARTMENT OF AGRICULTURE :
Federal Extension Service : Cooperating with Land Grant
Washington 25, D.C. : Colleges and Universities

ANALYSIS OF A MODERN SUPERMARKET

TECHNIQUE USED AND RECOMMENDATIONS RESULTING

118 (8-62)

PREFACE

Although the names of the firms must remain anonymous, this study was made possible by the generous cooperation of a supermarket and a grocery wholesaling organization in the state of Michigan.

Quality of plant and equipment used in this store was believed by us to be far above average. The skill and enthusiasm of employees working in the store was, almost without exception, of very high calibre.

Special recognition needs to be given to the store manager and all of the store employees. Their willingness to cooperate and interest in learning contributed greatly to this study.

Lewis F. Norwood, Jr.
Food Merchandising Specialist
Federal Extension Service
Department of Agriculture
Washington, D. C.

Kendall Adams, Instructor
Agricultural Economics Department
Michigan State University

CONTENTS

TABLES

LAYOUTS

CONTENTS

(Continued)

OBJECTIVES OF THE STUDY

Teaching through use of the demonstration method is not new to Cooperative Extension work in land grant colleges and universities. Demonstration farms are quite common. Home demonstration agents are in nearly every county where there is an Extension staff. The effectiveness of demonstration seems to rely on the principle that showing is more effective than telling or reading. The demonstration is a well tried and long accepted teaching device.

The long run objective of a study of this type is to test and demonstrate certain approved operating practices in an actual supermarket. Other similar supermarket owners could learn by observing the practices in action. Thus, studies of this type have become known as demonstration store studies. The store reported on in this report is referred to as the "D" store in respect to the demonstration objective of the study.

A shorter run objective of this study is to describe a method by which the operating effectiveness of any supermarket can be evaluated. The method has three basic parts: (1) study of the shopping patterns of customers in the store; (2) examination of the store's income statement; (3) application of research recommendations to work methods being used in materials handling, preparation of goods for display, and the display of goods in the store.

Thus, this study is itself a demonstration device because it demonstrates a methodology which can be used to arrive at recommended changes in any supermarket.

This report is intended to be of specific interest to certain specialists hired by grocery wholesalers. These specialists have the job of recommending improved operating practices to owner-managers of supermarkets. In addition, it is believed that the report will be useful to top management of grocery wholesaling firms. Top management in these firms has the responsibility of allocating the firm's scarce resources. Therefore, both specialists and top management at the wholesale level are interested in the kinds of results that can be produced by this type of store analysis and the kinds of manpower and other resources required to do the study.

The report is also intended to be useful as a means of pointing out the void between available information and some current practices in food retailing. Education is the means typically used to close the gap between knowledge and practice. Thus, perhaps this report will serve to point out

the areas where there is a difference between knowledge and practice and help define a useful educational approach.

SOME CHARACTERISTICS OF THE SUPERMARKET STUDIED

The store studied is part of a multiple ownership group in which there are four stores. 1/ The store is also a member of a retailer owned group in which there are 426 other stores.

The entire store building contains approximately 10,600 square feet. It is situated at one end of a "U" shaped shopping center. The shopping center is located in a city with a population of approximately 7,000.

The store has a manager and an assistant manager. Three of the store's four owners act as supervisors. They call on the store almost daily. One of the owners specializes in supervising the grocery, the other the meat department, and the third is a general supervisor.

Each of the full time employees was interviewed in the store before the study began. The purpose of the study and the methods to be used were explained to each employee at this time. Some information was obtained from each employee about his job, but complete position descriptions were not made.

All forms dealing with income and expense records were filled in by the store's accountant. An original blueprint of the store was supplied. All other information about the store was supplied on request.

The store selected was chosen for several reasons. It was a new store having been open for only two years. Specialists employed by the wholesaler had helped plan the construction and layout of the store. The store owners were enthusiastic about adopting better methods and learning where these methods could be applied to their store.

The store recorded sales by grocery, meat and produce departments. Departmental records of sales were prerequisite for any store selected for this study. The wholesaler supplying the store's grocery needs employed many specialists in certain aspects of store operating practices. The wholesaler encouraged the study because he wanted to learn about the proposed method of store analysis to be used and the recommendations to be made.

1/ The store studied was considered in the category of an owner-managed store. All policies affecting the store were determined by the owners. There was no attempt to operate each of the four stores under the same set of policies.

EXAMINATION OF THE INCOME STATEMENT

An income statement shows the amount of sales and net profit resulting for a specific time period called a fiscal period. The primary objective in examining an income statement is to explain the level or amount of net profit.

Two principal approaches are often used to examine the income statement: (1) comparison with results of other stores; (2) comparison with past results of the same store. Past results have the advantage of showing trends in the same store. However, it is difficult to set high or low limits when results are compared to themselves. Comparisons with other stores permit high and low limits to be set. However, the disadvantage is that the various factors influencing net profit are never the same for different stores.

Comparison stores used in this report were similar to the "D" store in two respects: (1) they were not part of centrally controlled chains; (2) they were in the $10,000 - $19,000 per week sales volume category.

Since gross margin and operating expenses are the two categories limiting net profit, the examination will focus on factors which, in turn, determine gross margin and operating expenses.

In this study, operating expenses were considered in three categories: (1) labor expense included wages, salary of manager and assistant manager; (2) expenses based on policy decisions by management included advertising, rent, depreciation, accounting, and administrative; (3) variable expenses included supplies, taxes, insurance, repairs, utilities, and the miscellaneous or "other" category of expenses.

Regardless of policy decisions or external factors, all stores are interested in increasing output from variable expenses. Therefore, comparisons with other stores are useful in establishing high and low ranges for these expenses.

Expenses determined primarily on the basis of policy decisions by management emphasize the unique characteristics of a certain store. The results of other stores are not too useful in setting high and low ranges for expenses based on policy decisions.

As shown in Table 1, labor as a percent of total sales compares very favorably with the other stores. In order to isolate the sources of labor

TABLE 1

INCOME STATEMENT COMPARISONS BETWEEN DEMONSTRATION STORE AND 25 STORES IN $10,000-19,999 PER WEEK SALES VOLUME CATEGORY[1]

	Average of 17 Stores		4 Most Profitable		Demonstration Store	4 Least Profitable	
Sales[a]	$804,333	100.0%	$796,543	100.0%	100.0%	$778,171	100.0%
Cost of Goods Sold[b]		84.2		83.8	82.01		86.2
Gross Margin		15.8		16.2	17.99		13.8
Expenses							
Wages[c]		6.0		6.0	4.99		5.9
Manager's salary[d]		1.0		.9	.88		.9
Assistant manager		.1		0	.62		.1
Administrative (see footnote)[e]		(.4)		0	.18		0
Advertising		1.7		1.2	4.14		1.6
Rent		.9		.7	1.28		.9
Supplies		.9		.9	.72		.9
Taxes		.8		.6	.54		.8
Insurance		.2		.2	.23		.2
Repairs, maint.		.2		.2	.27		.3
Utilities		.7		.5	.92		.8
Depreciation		1.1		.9	1.62		1.3
Accounting		.1		.1	--		.1
Other		.3		.4	.67		.3
Total		14.0		12.6	17.06		14.1
Net Operating Profit		1.8		3.6	.94		- .3
Interest[f]		.1		.1	--		.1
Other income		--		--	.92		--

[a]Sales; Total gross receipts from three departments. Does not include receipts from eggs wholesaled, frozen food locker rentals, snack bars, or from leased departments.

[b]Cost of goods sold: Delivered cost of food items offered for resale. Includes freight and cost plus. Does not include membership and advertising charges.

[c]Wages: Includes wages and bonuses of all hired employees except store manager and assistant manager if they are not directly in charge of a department in the store.

[d]Manager's salary: includes (1) salary and bonuses of hired manager, (2) owner-operator (manager) salary estimate based on highest paid employee plus ten per cent of this wage.

[e]Administrative expense: Cost of supervisory and administrative personnel in two or more store organizations. Not reported for stores in $10,000-19,999 sales category. Figure shown is for $20,000 to 39,999 category.

[f]Cost of borrowed capital.

[1]Eric C. Oesterle, Independent Food Store Business Summary, 1959 (Lafayette, Indiana: Purdue University, Agricultural Extension Service, n.d.), p. 39.

expense, it is useful to look at the distribution of labor expense by departments as shown in Table 2. 1/ The meat and produce departments show particularly low labor expense with high wage cost and sales per man hour. These results appear to indicate that a high calibre of very productive employees are working in these departments. Our observation, however, revealed that all of the hours going into meat and product departments were not actually being charged to these departments. It appeared that managers of the meat and product departments were putting in longer hours than were actually being charged to the departments.

The slightly higher grocery department labor expense could be due to labor being charged to the grocery department that was actually being used in meat and produce. The exceptionally high sales per man hour in checkout would indicate that this operation is being subsidized by labor from the grocery department which is not being charged to checkout. If this were the case, the indication would be that the checkout operation is making the least efficient use of labor of any of the activities in the store because of the high wage cost per hour of checkout labor accounted for.

The high overall sales per man hour and low overall labor expense indicate that labor is producing at a very satisfactory level in the entire store. The analysis of labor does raise a question concerning allocation to departments. There is an indication that labor is not being allocated accurately at the present time. When overall labor expense is low, as in this store, management is probably less concerned about the allocation of labor to various departments in the store. However, if overall labor expense were not low, management would want to know the source of the increase. Without previous records allocating labor, the source of increase would be difficult to find.

The high sales per man hour in the meat and produce departments indicates that non hourly paid department heads are probably putting in a lot of hours that are not being charged to the departments. The point to be made by this observation is that perhaps these department heads are doing work which should be done by hourly paid employees.

If this were the case, the department heads could be developing work habits which would be very difficult to change. At a higher sales volume, scheduling of jobs to be done and man hours would be much more important than at the present sales volume. It would seem that now is the time for the department heads and store manager to develop skills in scheduling labor and work.

Gross margin is the other primary factor limiting net profit. Overall gross margin is limited by the gross margin by departments and the

---

1/ Allocation of labor is shown in Appendix A. Allocations were made on the basis of estimated time schedules made out by the employees.

TABLE 2

COMPARISON OF DEMONSTRATION STORE AND DEPARTMENTAL OPERATING RATIOS OF 17 STORES IN $10,000-19,999 PER WEEK SALES VOLUME CATEGORY[1]

	Average of 17 stores	4 Most Profitable	Demonstration Store	4 Least Profitable
Sales				
Grocery[a]	66.1%	63.0%	69.22%	65.0%
Meat[b]	27.0	28.9	24.24	28.1
Produce[c]	6.9	8.1	6.54	6.9
Total	100.0	100.0	100.00	100.0
Gross Margins				
Grocery	13.7%	13.0%	16.63%	12.3%
Meat	18.8	21.0	19.95	14.9
Produce	25.8	25.4	24.97	24.0
Total	15.8	16.2	17.99	13.8
Labor Expense[d]				
Grocery (% of Dept. Sales)	2.3%	2.4%	2.97%	2.3%
Meat (% of Dept. Sales)	8.0	8.2	7.47	8.2
Produce (% of Dept. Sales)	11.8	10.1	6.16	12.4
Checkout (% Total Sales)	1.9	1.3	1.37	3.4
Management (% Total Sales)	1.0	.7	.57	1.0
Office, Misc. (% Total Sales)	.2	.1	--	.1
Total	7.1	6.8	6.2	6.9
Wage Cost Per Hour[e]				
Grocery	$1.39	$1.35	$1.26	$1.46
Meat	1.73	1.68	2.19	1.76
Produce	1.73	1.62	1.80	1.72
Checkout	1.19	1.06	2.00	1.18
Total	1.56	1.42	1.84	1.60
Sales Per Man Hour[f]				
Grocery	$63.86	$57.40	$42.27	$69.88
Meat	22.20	20.59	29.37	21.52
Produce	14.87	15.78	29.28	15.25
Checkout	80.36	86.10	146.16	86.86
Total	22.00	20.86	29.67	23.20
Inventory Turnover[g]				
Grocery	23.6	25.4	18.11	27.7
Meat	90.5	93.3	67.7	128.1
Produce	124.1	72.3	51.0	109.9
Total	32.7	33.0	28.89	39.2

[a]Grocery: All items excluding meat and produce sales.

[b]Meat: Fresh and smoked meats; canned hams; poultry, fish.

[c]Produce: Fresh fruits and vegetables.

[d]Labor: Includes manager's hours spent in various departments.

[e]Wages/Hour: Weekly departmental wages divided by total departmental hours.

[f]Sales/Man Hour: Weekly departmental sales divided by total departmental hours.

[g]Inventory Turnover: Cost of goods sold divided by average inventory.

[1]Eric C. Oesterle, Independent Food Store Business Summary, 1959 (Lafayette, Indiana: Purdue University, Agricultural Extension Service, n.d.), p. 40.

proportion of sales contributed by these departments. Gross margin in each department is limited by stock depreciation, shrinkage, pilferage and the proportion of sales accounted for by goods in the department assuming the goods do not have the same margins. Proportion of sales by each department is limited by pricing policy, displays, preparation and packaging methods, advertising and sales promotion, value offered by the goods, in-store selling practices, and customer exposure. Of the many possible factors influencing proportion of sales, customer exposure was the only one examined objectively in this study.

Table 2 shows the proportion of sales of the grocery, meat and produce departments in store "D". Compared to the 25 other stores, proportion of sales appears high for groceries and low for meats and produce. Perhaps this is due to competitive pricing policy in which groceries are used as a price attraction. If this were the case, gross margin on grocery sales should be relatively low as compared to relatively higher gross margins in meat and produce.

Gross margins by departments show, however, that gross margin in groceries tends to be higher while, in meats and produce, gross margin tends to be lower than comparison stores. Thus there is an indication that the store is placing disproportionate emphasis on the department with the lowest margin.

It is not possible to conclude that the distribution of sales and margins by departments are out of balance because they differ from the comparison stores. However, knowing the sales distribution and gross margin by departments, management is in a better position to determine the sources of profits and the kind of action most likely to improve profits.

Although net profit is limited directly by operating expense, operating expense is indirectly affected by the output level of plant and equipment. Therefore, in explaining net profit it is helpful to evaluate the productivity of plant and equipment. This evaluation occurs in Table 3 where weekly sales per square foot of store selling area and per linear foot of display are shown. Within each of these categories, comparison indicates that the "D" store is operating considerably below its capacity. Thus, overall sales volume level is a likely explanation for the comparatively low inventory turnover rates shown in Table 2.

The same condition could be used as a partial explanation of the relatively high rates occurring in those operating expense categories which are relatively constant regardless of sales volume such as advertising, rent, depreciation, and utilities. Based on the weekly sales per square foot, it was estimated that the store studied was operating at about 60 percent of capacity.

TABLE 3

OPERATING DATA FROM DEMONSTRATION STORE COMPARED TO 25 STORES IN $10,000-19,999 PER WEEK SALES VOLUME CATEGORY[1]

	Average of 17 Stores		4 Most Profitable		Demonstration Store	4 Least Profitable	
Store Area (Square Feet)							
Selling	4,583	72%	3,554	68%	63%	4,629	73%
Preparation; Storage	1,800	28	1,688	32	37	1,677	27
Sales/Week/Square Feet							
Total Store	$2.54		$2.93		$1.70	$2.36	
Selling Area	3.54		4.34		2.73	3.24	
Linear Feet of Display[a]							
Grocery	60%		63%		62%	58%	
Meat	7		7		10	6	
Produce	9		11		11.1	10	
Dairy	4		4		4.2	4	
Frozen Foods	5		5		2.6	6	
Non Foods	15		10		10 (estimated)	16	
Weekly Sales per Linear Feet of Display							
Grocery	$16.67		$22.22		$19.58	$14.16	
Meat	90.31		109.76		49.07	84.82	
Produce	17.77		20.22		12.03	13.55	
Total	21.72		28.78		21.87	19.46	

[a]Measures only the length of a given display or the length of display equipment. Does not measure height, width, or number of shelves in a piece of display equipment.

[1]Eric C. Oesterle, Independent Food Store Business Summary, 1959 (Lafayette, Indiana: Purdue University, Agricultural Extension Service, n.d.), p. 42.

Because the store was relatively new, management had decided to emphasize advertising expenditures, including stamps, to facilitate breaking into the market. Management is recording market share information periodically and plans to reduce promotion expenditures when market share reaches a level satisfactory to them.

It should also be mentioned that the other income shown in Table 1 consisted of advertising rebates and overcharges refunded by the wholesaler. Thus, other income could reasonably be considered a part of profit from store operations. Also, the results of the "D" store shown in Table 1 were accumulated and averaged over a period of four quarters. Had the quarters been compared, it could have been shown that the combined operating profit in the most recent two quarters was more than twice as large as combined operating profit in the first two quarters. Averaging the four quarters tended to understate the present profitability of store operations.

GROCERY STORAGE ROOM LAYOUT AND WORK METHODS

Present grocery receiving is done in a rectangular room 97 feet long and 14 feet wide. A skate wheel conveyor 76 feet long runs along one side of the room. Most of the items are stored on eight wooden bays or platforms extending from one wall to within 3 feet of the roller conveyor. Goods can be stored under and on top of each bay. Another storage shelf is located above the conveyor. This shelf extends approximately half the length of the conveyor. Two of the storage areas in the room do not have bays or shelving. Stacks of goods are stored in these areas. Present arrangement of the receiving and grocery storage area is shown in Figure 1.

Unloading is done by extending skate wheel conveyors into the loaded freight truck. The truck driver unloads onto the conveyor extensions. Goods move by gravity through a receiving opening in the rear wall of the store onto a permanent conveyor. Two store employees receive the goods by carrying each case from the conveyor to the bays or open storage areas. The smaller freight load is received on Wednesday and the larger one on Friday. Unloading is done in the morning before the store opens for business. Dry groceries and frozen foods are received on the same truck.

In order to store all merchandise received on the larger load, it is necessary to build some stacks of goods several cases high. High stacks make handling difficult. It is possible that the need for high stacking could be lessened if two loads of similar size were received each week.

Ideally, merchandise received should be separated into merchandise to be stocked first and merchandise to be stocked later. If goods to be

stocked first could be separated at the time of receiving, some rehandling occurring later could be avoided. At the present time, space under the conveyor is being used for general storage. Consideration should be given to using this space for temporary storage of those items that are going to be stocked first. The space under the conveyor should be cleared of all merchandise before each new load is received.

The shelves above the conveyor should be reserved for lightweight items since the minimum distance between the shelf and the conveyor is 30 inches.

Blocked passageways often slowed movements of hand trucks or four wheeled trucks through the storage area. It is recommended that lines be painted on the floor designating traffic lanes. The traffic lanes are to be kept clear of trash and merchandise to facilitate movement through the storage area.

A padlocked rear door hampered access to the trash storage area. Trash accumulated in the grocery storage room could have been due to the extra trouble of unfastening the padlock. It is recommended that the padlock be replaced by a sliding bolt lock for daytime use. The padlock can be fastened at night.

The present general layout of the grocery room appears to be quite satisfactory. 1/ It is suggested, however, that a price marking station be set up at the lower end of the conveyor. The price marking station would be used on all tray pack cutting and price marking and for pricing other items stocked during the busier store hours. The objective is to remove congestion caused by tray pack cutting and tray pack price marking in the shopping area. 2/ The separate work station for tray packing should make handling and price marking easier and faster.

A stocking cart should be positioned next to the pricing station where the coke machine is located. Remove the coke machine and arrange to have sales made to employees through the checkouts.

1/ Cf. E. M. Harwell, and Paul F. Shaffer, Some Improved Methods of Handling Groceries in Self Service Retail Food Stores, Marketing Research Report No. 7 (Washington: United States Department of Agriculture, 1957), p. 27. This publication gives details on some alternate layouts for grocery storage rooms. Various price marking stations are also discussed.

2/ Paul Shaffer and James Karitas, "Lowering Price Marking Costs in Retail Food Stores," and Alan Greene and Paul Shaffer, "Tray Pack Speeds Up Shelf Stocking in Grocery Stores," Agricultural Marketing,(May 1960), reprint. These articles illustrate and describe a recommended tray packing and price marking station. See also: Paul Shaffer, John C. Bouma, James J. Karitas, and Gordon Flynn, Handling Groceries From Warehouse to Retail Store Shelves, Marketing Research Report No. 473 (Washington: United States Department of Agriculture, 1961), p. 32. A photograph is shown of a recommended price marking station and a price marking set for the station. Other aspects of price marking stations and price marking are discussed in this bulletin.

Consideration should be given to clearing the wall and area now containing the time clock and drinking fountain. The time clock could be fastened to the office wall. The drinking fountain could be located in the store selling area for use by customers as well as employees.

A trash dolly should be located next to the stocking cart. Another trash dolly should be located in the grocery storage room next to the rear entrance from the selling area. Trash accumulated from shelf stocking should be taken to this trash dolly when the stocker returns from the selling floor to the storage room.

The suggested layout for the grocery storage area, shown in Figure 2, shows the following changes: (1) access aisles have been designated by dashed lines painted on the floor; (2) two trash dollies have been positioned; (3) the area containing the clock and drinking fountain has been cleared; (4) a tray pack and price marking station has been designated.

LAYOUT STORE SELLING AREA

One of the generally accepted objectives of store layout is to guide customers through the entire store. Another objective is to place items in heavy traffic areas which benefit most from customer exposure. Therefore, it is important to have an estimate of customer traffic and how it disperses itself through out the store.

Eighty customers were observed as they made their shopping tour through the store. The path taken by each customer was marked on a notebook size sheet of paper which contained a diagram of the store. One diagram was used for each customer. Later, all observations were accumulated. The accumulated observations are shown in more detail in Appendix B.

The lined parts of Figure 3 represent areas in the store which were passed by at least half of the customers observed. The unlined areas were passed by fewer than half of the customers observed. These results show that half of the customers observed passed only about one-third of the total display footage in the store. The areas of least traffic are shown to be in the center of the store and in certain sections of the produce display area.

Suggested changes to be made in the arrangement of display equipment in the store's selling area are shown in Figure 4. The changes are intended to draw customers into the center of the store as well as along the perimeter and to the display in heaviest traffic areas those items benefiting most from customer exposure. The suggested changes in the recommended store layout are summarized as follows:

(1) Establish a bottle return check station and storage cart at number 4 checkout.

FIGURE 1

PRESENT LAYOUT OF GROCERY STORAGE AREA

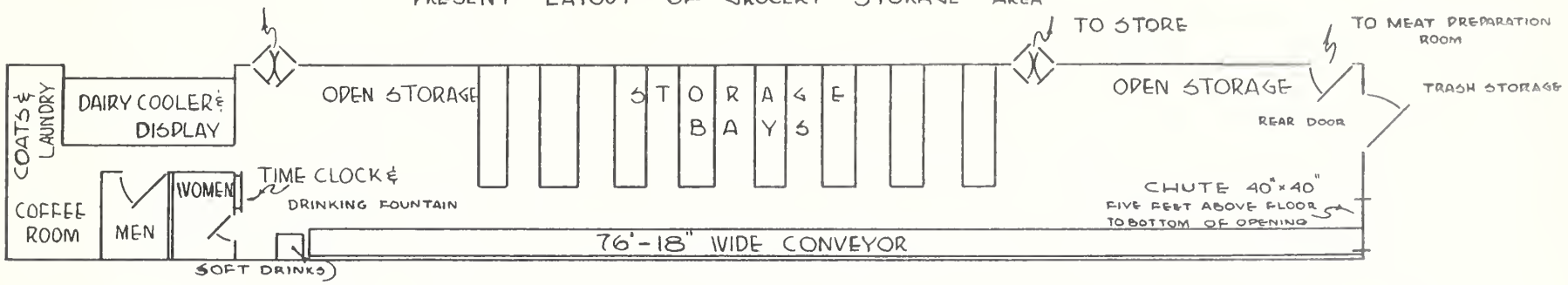


FIGURE 2

SUGGESTED LAYOUT OF GROCERY STORAGE AREA

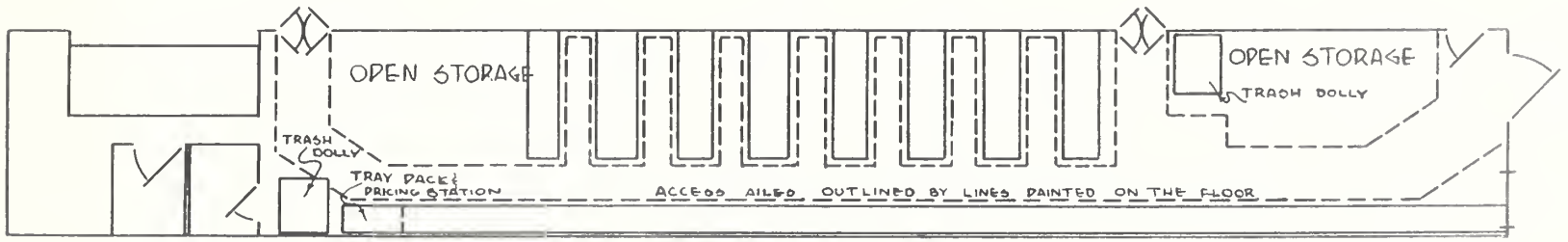


FIGURE 3

LINED DISPLAYS PASSED BY AT LEAST 50 PER CENT OF THE CUSTOMERS OBSERVED—UNLINED DISPLAYS PASSED BY FEWER THAN 50 PER CENT OF THE CUSTOMERS OBSERVED

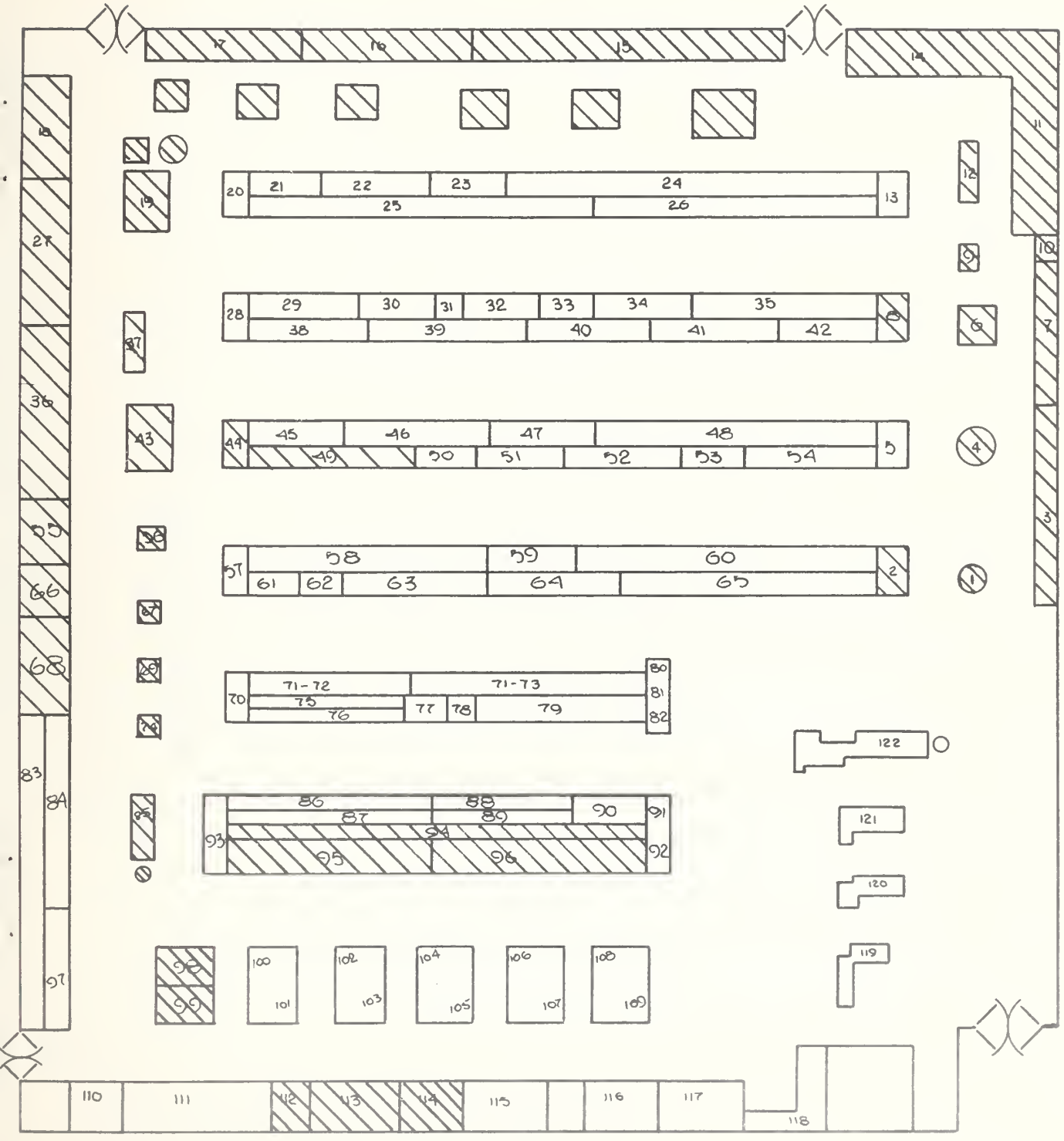
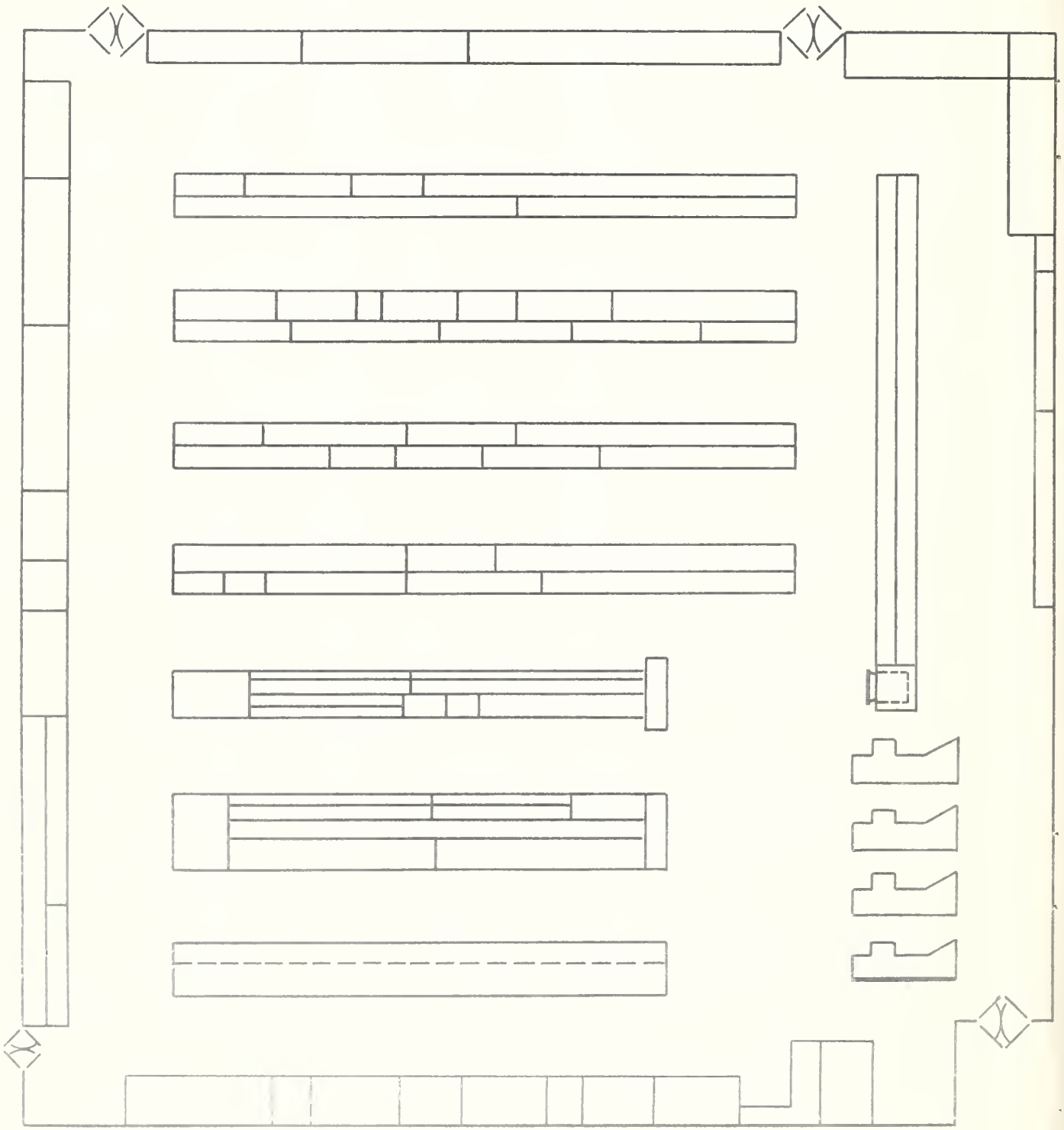


FIGURE 4

SUGGESTED SALES AREA LAYOUT



(2) Build a solid display fixture starting at the bottle return station and continuing to within eight feet of the refrigerated milk display. Use this for tray pack displays.

(3) Move present gondola fixtures to within eight feet of the self-service meat and frozen foods displays. The two refrigerated cases now being used as island displays should be moved to the gondola ends.

(4) Remove all temporary island displays.

(5) Replace produce island displays with a solid display for citrus and non-refrigerated produce. Use backside as a peg board to display all household hardware and soft goods which are now being sold from several separated peg board locations.

(6) Replace present magazine rack with a lighted rack. Position it on the inside of the feature display gondola near the end next to the bottle redemption station.

(7) Replace present potato display with portable tiers and overhead lights. Produce feature items should be displayed on these tiers.

(8) Display health, beauty, and grooming aids in the section now used for coffee, hot drinks and canned milk, display candy in the section now being used for bread and pastry, display bread and pastry in the section now being used for household tissue products, display potatoes on the end of the dry produce display nearest the checkout area. Use gondola ends for permanent displays. Use center aisle displays for feature items. The aisle displays could be built from the floor, with three in each aisle, on alternating sides. Display a featured meat item on the end of the display case near the perimeter aisle.

The foregoing suggestions on display will now be discussed in more detail:

(1) Bottle returns are now being received in the produce preparation room. A customer entering the store with bottles to redeem has two alternatives: (a) take the bottles to the redemption areas and then return to the front of the store to begin her shopping tour, (b) shop the store with the empty bottles until the redemption area is reached. Both of these undesirable alternatives could be eliminated by a redemption station counter

built beside the number four checkout. Upon receiving the bottles, the customer would be paid before beginning her shopping tour. The bottles could be stored in a four wheeled hamper located beneath the redemption counter and pushed to the bottle room when full. An empty hamper should be waiting in the bottle room to replace the full hamper. Bottle storage could be completed by part-time employees.

(2) The continuous display fixture for featured items offers a device for displaying mass quantities of tray packed goods and other featured items, mass displayed. The solid display area tends to concentrate store traffic in this area. The other side of the aisle contains displays of health, beauty and grooming aids, which are generally thought of as unplanned purchases where rate of sale is influenced by customer exposure. Therefore, any device which could be employed to concentrate customer traffic in a certain area should increase the sale of these products.

(3) At present, six rows of gondola display fixtures are located in the middle portion of the store. Moving fixtures to within eight feet of the meat and frozen food cases will provide an access aisle on both ends of each row of gondolas. The narrower access aisles will tend to concentrate the flow of customer traffic on specific parts of the meat display. Moving the two refrigerated displays units against two of the gondola ends near the meat case will give maximum exposure to the refrigerated display units and also the self-service meat display. The refrigerated units were being used as island displays. They tended to separate the customer traffic keeping some of it from going to certain areas of the self-service meat display.

(4) Many temporary island displays are used in this store. Every perimeter aisle contained at least five island displays. The advantage of an island display is that it is passed by every customer coming down the aisle. It is easy to see because it stands alone. The disadvantage is that an island display separates customer traffic. A customer must go on one side or the other of the island.

According to the customers observed, the most popular of 14 grocery island displays was one featuring canned coffee at an advertised price. Seven percent of the customers sampled made purchases from this display. Four to six percent made purchases from three other island displays. Of the remaining 10 grocery island displays, 2 percent or fewer of the customers observed made purchases from them.

(5) At the present time there are six island displays in the produce department. It is suggested that a single display fixture be provided in place of the six islands. The single display should provide a better surface for mass displays. The produce department appears to need more of the attractiveness gained from large, single item displays. A peg board could be attached to the back of the fixture. All household hardware and soft goods could be displayed from this peg board. Most of the present peg board displays of household goods are relatively difficult to reach. A peg board on the back of the produce display fixture would be much more accessible.

(6) The present magazine rack is not presenting the product attractively. Recessed lights should be used to brighten each display shelf on the fixture. One possible location for the new magazine display would be on the backside of the feature display gondola near the number four checkout.

(7) The weekly produce feature displayed on tiers, under lights will be noticed many feet away and will help draw customers into the produce area. With the present arrangement, most of the produce display area was passed by fewer than half of the people observed in the customer flow sample. The featured display described should bring more customers into the produce display area.

(8) The suggestions on changes in display locations were made with the following objectives in mind: (a) sales of candy, health and beauty aids are thought to benefit from exposure to customer traffic. Therefore, these items should be moved to the part of the store where traffic will be heaviest after installation of the feature display gondola; (b) as a result of the customer flow study, it was shown that the highest percentage of customers purchased from the bread and pastry display area than from any other single area in the store. Therefore, it is proposed that bread and pastry be moved to a position toward the end of the shopping tour as a device to draw customers through the entire store; (c) potatoes are a bulky, staple food item available the entire year. Placing them near the checkout should be a convenience to the customer and might serve to encourage the customer to buy larger units; (d) gondola ends are not large, offering only a brief exposure to a customer's attention. Featured items displayed on gondola ends do not encourage the customers to tour the entire aisle. Due to these factors, it is suggested that the gondola ends be used for racks and other more permanent type

of displays - such as sugar; (e) some featured items should be displayed in the center aisles to encourage customers to shop the entire length and both sides of the aisle thus tending to create customer traffic down the aisle which has a kind of bounce pattern to it; 1/ (f) part of the meat display case is exposed to the view of customers coming down the first perimeter aisle. A featured item should be placed in this section each week in order to draw customers down the aisle and into the meat display area.

OPERATING PRACTICES IN THE GROCERY SALES AREA

Problem	Recommendation
1. Vendor stocking. Some vendors bring several loads to the stocking area before they begin to stock. Result is congestion on the sales floor.	1. Vendors should be required to clear aisle of their merchandise before bringing another load to the stocking area.
2. Identifying specials. Some featured items give impression of being "nailed down" because they are not identified.	2. Use manufactured signs to identify all featured items. A specific station for sign materials storage and sign making should be designated. Station could be located where meat department phone and desk are now.
3. Beverage storage. Part of present beverage storage is in the compressor room and is not easily accessible. The remaining beverage storage is in the store sales area where it takes up selling space.	3. Beverage storage should be moved to the area between produce and meat receiving doors. This is the area now being used for produce processing.
4. Inventory control. At present, inventory control and ordering are performed separately.	4. Consider combining inventory control and ordering into one operation. 2/

1/ Dale L. Anderson and Paul F. Shaffer, Display Location and Customer Service In Retail Produce Departments, Marketing Research Report No. 501 (Washington: United States Department of Agriculture, 1961), pp. 9-24. The idea of the bounce pattern in customer traffic as applied to the produce department is discussed in detail in this bulletin.

2/ Cf. Martin Kriesberg, Control of Inventories in Retail Food Stores Through Use of Order Books, Agricultural Marketing Service, 237 (Washington: United States Department of Agriculture, 1958), 15 pp. This publication illustrates several ways of combining inventory control and ordering.

MEAT PROCESSING ROOM LAYOUT AND EQUIPMENT

A sketch of present equipment layout in the meat processing room is shown in Figure 5. After sawing and trimming, retail meat cuts are carried on metal trays to the refrigerated conveyor referred to in the trade as a "rolling cold." Two metal platforms attached to the top of the refrigerated conveyor serve as wrapping surfaces. The platforms can be pushed on rollers along the conveyor.

Pans of meat placed in the refrigerated conveyor are moved by pushing them along on the skate type wheels located in the bottom of the conveyor. Since both ends of the conveyor were the same height from the floor, the pans could not move from a higher to a lower end by gravity. A weighing and pricing station is located at one end of the conveyor. A holding cabinet for packaged and price marked meats is located near the weighing and pricing station.

Figure 6 shows one layout suggested for the meat processing room assuming addition of a minimum of new equipment. In this layout, the need for carrying pans from cutting tables to the conveyor would be reduced. The end of the conveyor opposite the wrapping station would be elevated. Pans of meat would travel by gravity along the conveyor to the wrapping and pricing station. Wrapping platforms would be removed from the top of the conveyor permitting easier flow of product down the conveyor.

Figure 7 shows the layout suggested if new meat processing room equipment were to be installed. In this layout, the refrigerated conveyor would be removed. Separate stations for cutting, wrapping and pricing would be set up and connected by roller conveyors. 1/ Produce flow would be continuous from saw to cutting tables, to wrapping stations then to pricing stations. Lifting and carrying of pans of meat could be almost eliminated with this layout.

1/ Cf. Edward M. Harwell, Dale L. Anderson, Paul F. Shaffer, and Robert H. Knowles, Packaging and Displaying Meats in Self-Service Meat Markets, Marketing Research Report No. 44 (Washington: United States Department of Agriculture, 1953), 86 pp. See also: Dale L. Anderson and Paul F. Shaffer, Principles of Layout for Self-Service Meat Department, Marketing Research Report No. 77 (Washington: United States Department of Agriculture, 1954), 37 pp. These reports contain photographs and diagrams of the cutting tables, wrapping stations, pricing stations shown in Figure 7.

FIGURE 5

PRESENT ARRANGEMENT OF EQUIPMENT IN THE MEAT PROCESSING ROOM

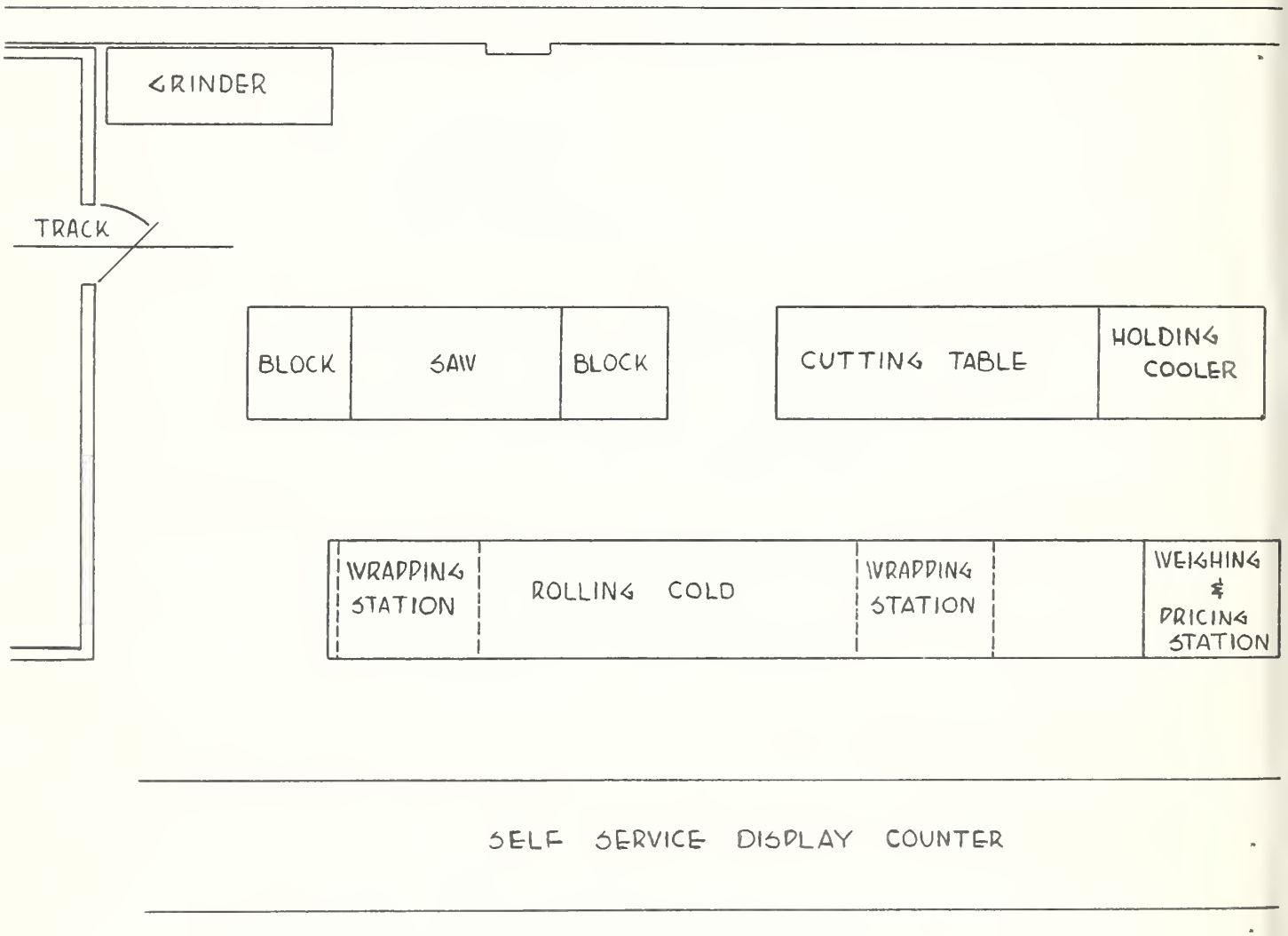
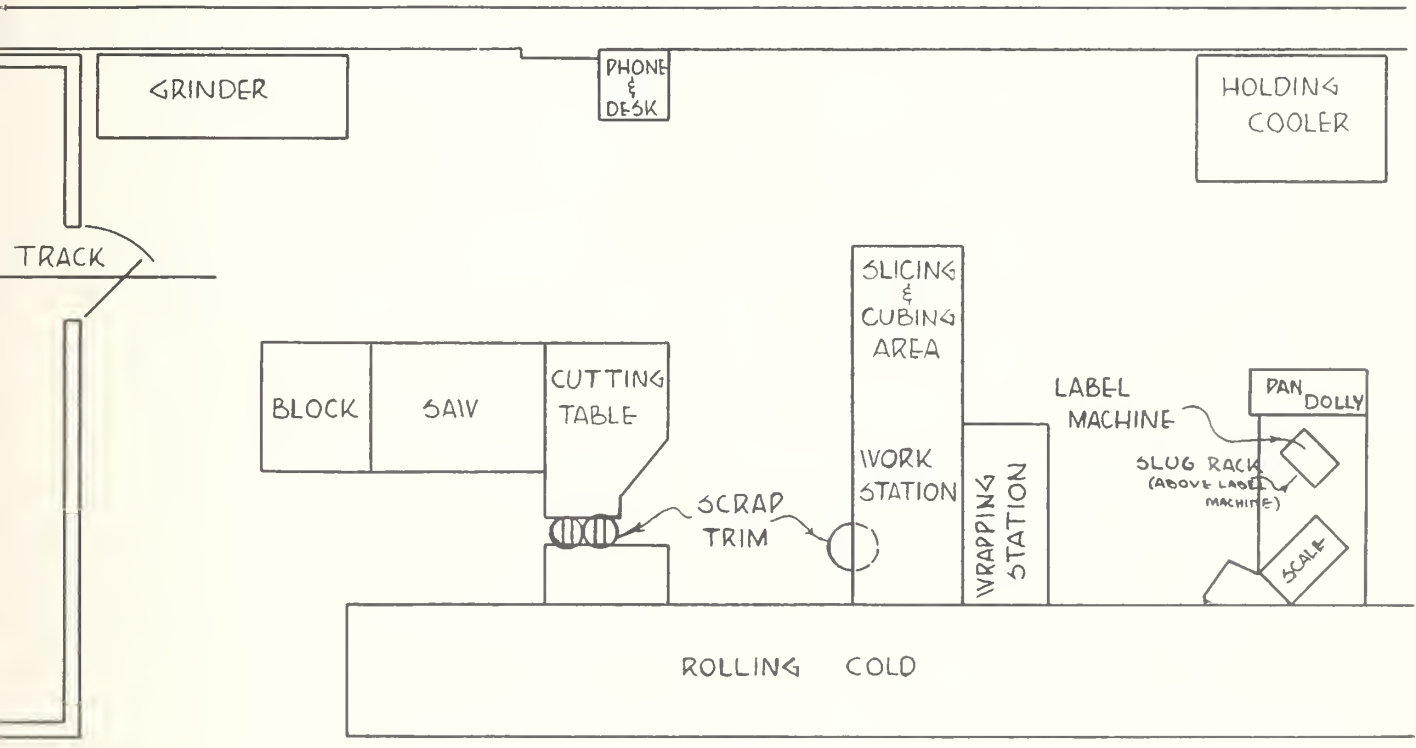


FIGURE 6

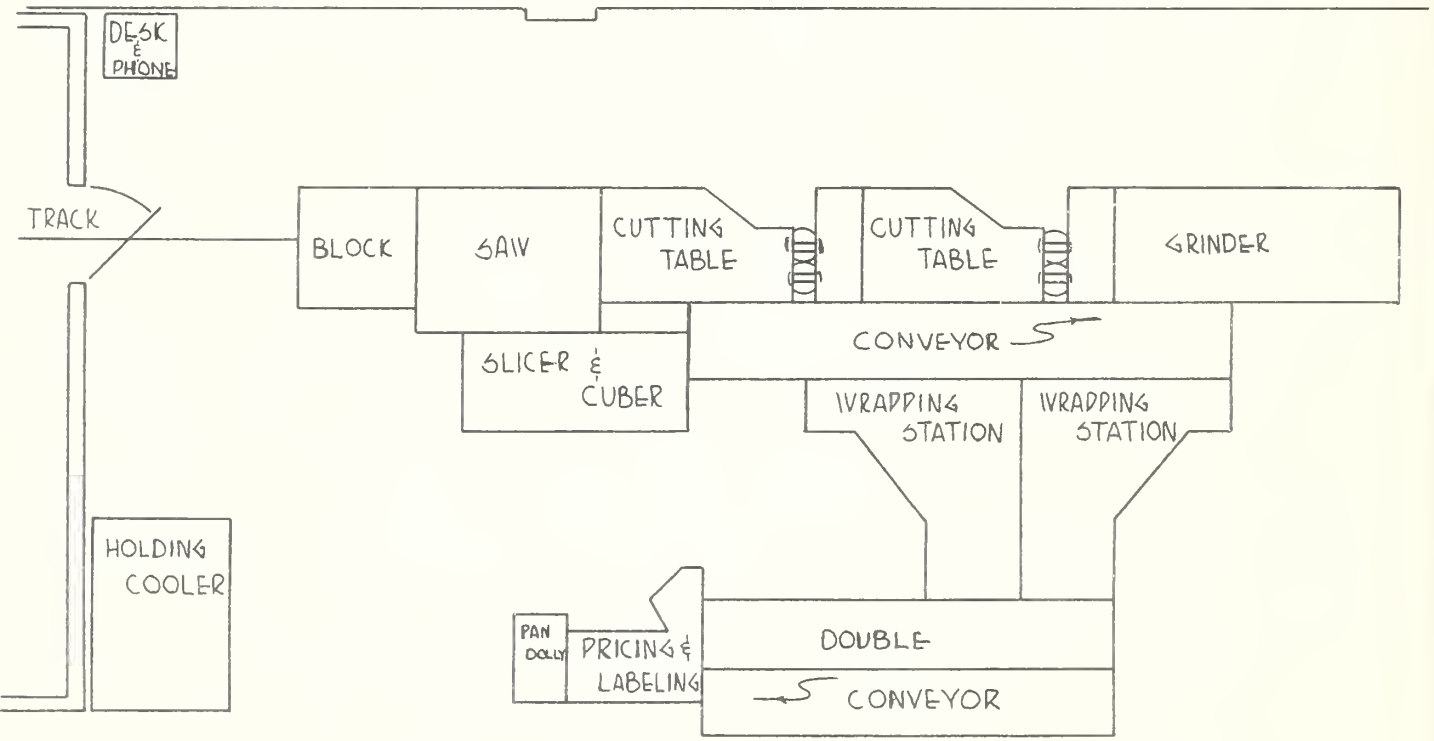
SUGGESTED ARRANGEMENT OF MEAT PROCESSING ROOM USING A MINIMUM OF NEW EQUIPMENT



SELF SERVICE DISPLAY COUNTER

FIGURE 7

SUGGESTED ARRANGEMENT OF MEAT PROCESSING ROOM USING SEVERAL PIECES OF NEW EQUIPMENT



MEAT DEPARTMENT OPERATING PRACTICES

Problem	Recommendation
1. Meat receivings are made from a separate entrance. An overhead rail runs from the receiving entrance into a receiving area containing a rail scale. From the receiving area the rail runs into the storage cooler and out to the cutting and packaging room. At present, beef quarters are being stored in the cooler. Breaking of quarters is done in the meat cutting and packaging room. Thus, it is often necessary to move an entire beef quarter to the cutting and packaging room when a certain primal cut is needed.	1. In order to facilitate the flow of product from the receiving area through cooler storage to the cutting and packaging room it is recommended the breaking of beef quarters be done on the rail in the receiving area. The primal cuts from the quarters could be consolidated on tree hooks. In this way, primal cuts will be more accessible to the meat cutters. 1/ The present receiving area should be large enough to permit rail blocking. It is 16 feet long and almost 8 feet wide. A utility work bench could be built along one side of the produce cooler. The receiving desk could be replaced with a clipboard for holding invoices. Invoice storage should be in the desk near the telephone in the processing room.
2. Rotation of meat on cooler rails.	2. Before receiving new items, consolidate present stock on as few rails as possible. Use empty rails for incoming meat. Storage rails installed in the future should have separate entering and exiting rails.
3. Machinery height.	3. Meat grinder should be raised to a work level more convenient for those using the equipment.

1/ Cf. Edward M. Harwell, Dale L. Anderson, Paul F. Shaffer, and Robert H. Knowles, Receiving Blocking and Cutting Meats in Retail Food Stores, Marketing Research Report No. 41 (Washington: United States Department of Agriculture, 1953), pp. 17 - 20.

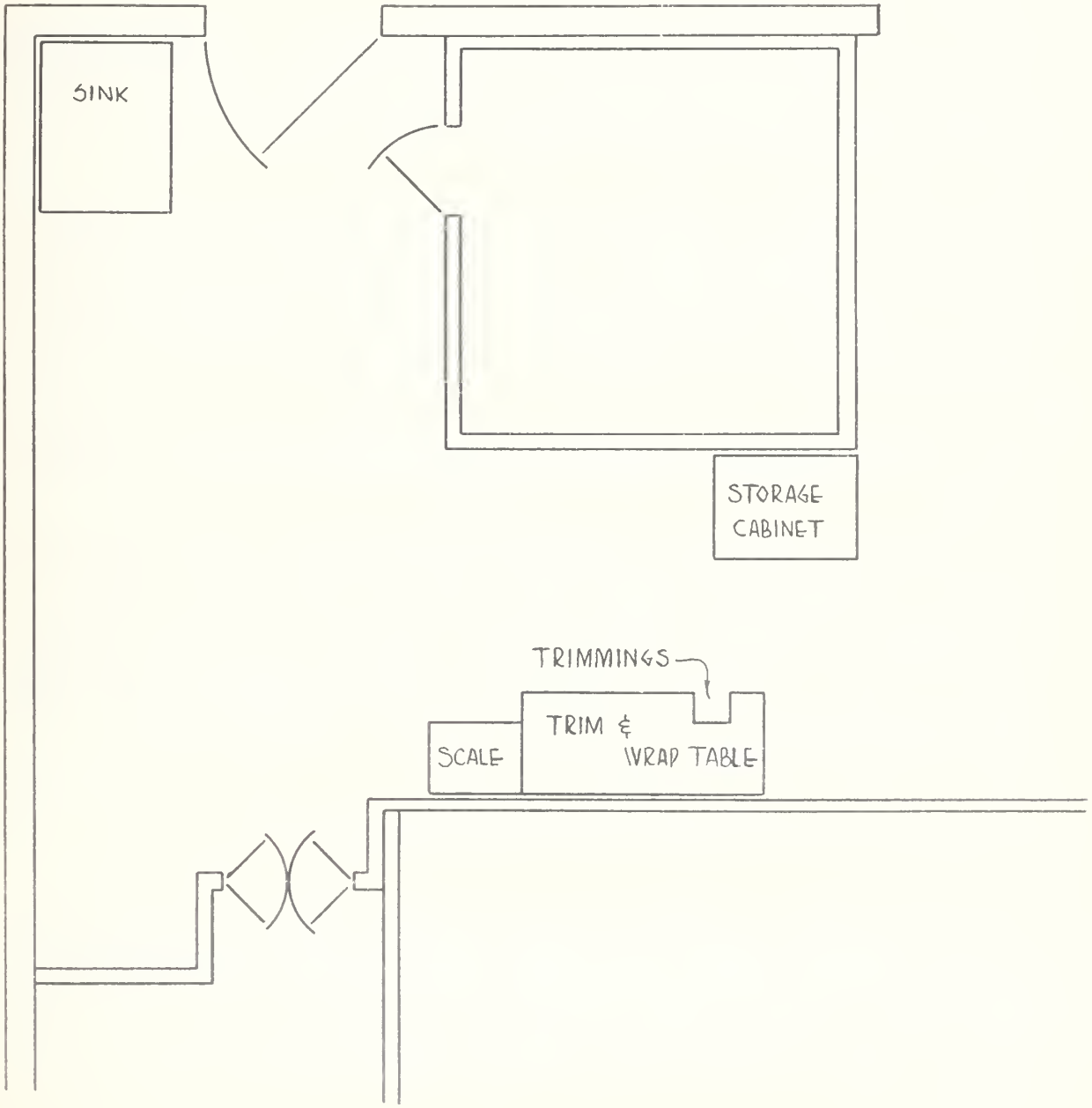
Problem	Recommendation
4. Work table height.	4. Cutting tables and blocks should be elevated to more convenient work heights.
5. Packaged meat storage. Limited storage for packaged meats results in using rolling cold for storage which interferes with movement of unwrapped packages.	5. Build racks in walk-in cooler for storage of packaged items. Rack shelving should be the same size as racks on stocking cart.
6. Travel to display area. Meat wrapper could make fewer trips to display area by taking a full cart with several items to be displayed. At present, display area is also being used as a storage area. Thus wrapper typically goes to display area each time she has completed wrapping some items.	6. Build storage racks in walk-in cooler. Before stocking, a list should be made of all items needed on display. The list should be filled from the storage racks and all needed items moved on the stocking cart to the display area in one trip.
7. Interruptions in manager's time caused by receivings.	7. Consideration should be given to lessening interference with manager caused by receiving. Possible alternatives could be to: (a) assign all weighing in and checking of meat receivings to an employee other than the meat manager, (b) consolidate receivings by central purchasing and delivery.

PRODUCE PROCESSING ROOM LAYOUT AND EQUIPMENT

Figure 8 shows the present produce preparation room layout. Produce is received through a rear door leading directly into the preparation area. Trimming, packaging and pricing are performed at a table near the doors leading to the produce sales area. Bottle, box, and trash storage occupies the preparation room space outlined by the inside wall of the building. A walk-in produce cooler is situated along the rear wall of the building. The cooler separates the meat receiving, produce receiving and preparation areas.

FIGURE 8

PRESENT PRODUCE PREPARATION ROOM LAYOUT



All items are packaged and priced before being displayed. Equipment provided for the prepackaging and prepricing activities consists of a work table with recessed heat plate and garbage chute for trimmings. A scale and tape dispenser are attached to an extension of the table. The weighing pan of the scale is about the same level as the surface of the table. Both heat-sensitive and gummed labels are used on the packages. Price marking is done with a rotary, self-inking stamp. Film storage racks are located above the wrapping surface.

Several observations were made of the equipment in use. Although designed specifically for produce preparation in this store, the equipment appeared to be poorly adapted to the requirements of produce prepackaging and prepricing. Figure 9 shows proposed layout for this store for fully prepackaged and prepriced produce selling.

The layout in Figure 9 contains a rack which will hold cases of untrimmed vegetables. Stooping by the trimmer is eliminated because the rack is located at a convenient height. Containers of trimmed produce items are moved by cart to the wrapping station. Wrapped items are moved by conveyor to a pricing station for weighing and pricing. From the pricing station, items can be taken directly to display or to the cooler for display later.

It is suggested that consideration be given in this store to bulk produce selling. Figure 10 shows a suggested preparation room layout for bulk selling.

If bulk sales of produce were to be used in this store, it is recommended that all weighing and pricing be done at the checkouts. This would eliminate the need for a weighing station in the produce sales area. 1/ The wrapping and pricing stations could be removed from the produce preparation room. In their place, a bagging, weighing and utility table could be added, as is shown in Figure 10, in order to provide a work surface to accommodate the occasional need for weighing, bagging, slicing and inspecting produce items.

1/ Dale L. Anderson and Paul F. Shaffer, Display Location and Customer Service in Retail Produce Departments, Marketing Research Report No. 501 (Washington: United States Department of Agriculture, 1961), p. 43. Weighing in the display area is compared to weighing produce at the checkout. The results indicate that checkout weighing requires less time.

FIGURE 9

SUGGESTED PRODUCE PREPARATION ROOM LAYOUT FOR PREPACKAGED SELLING

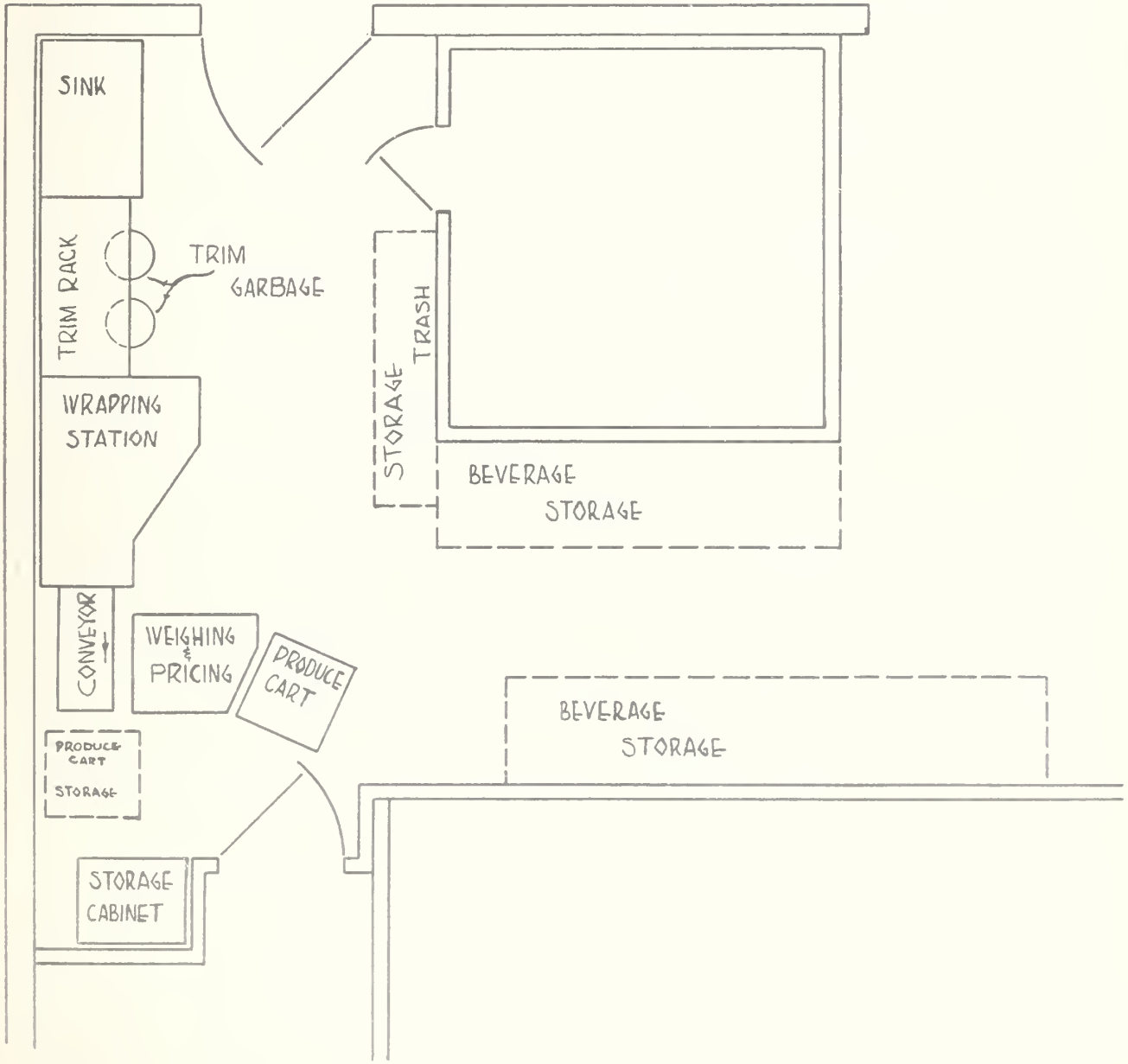
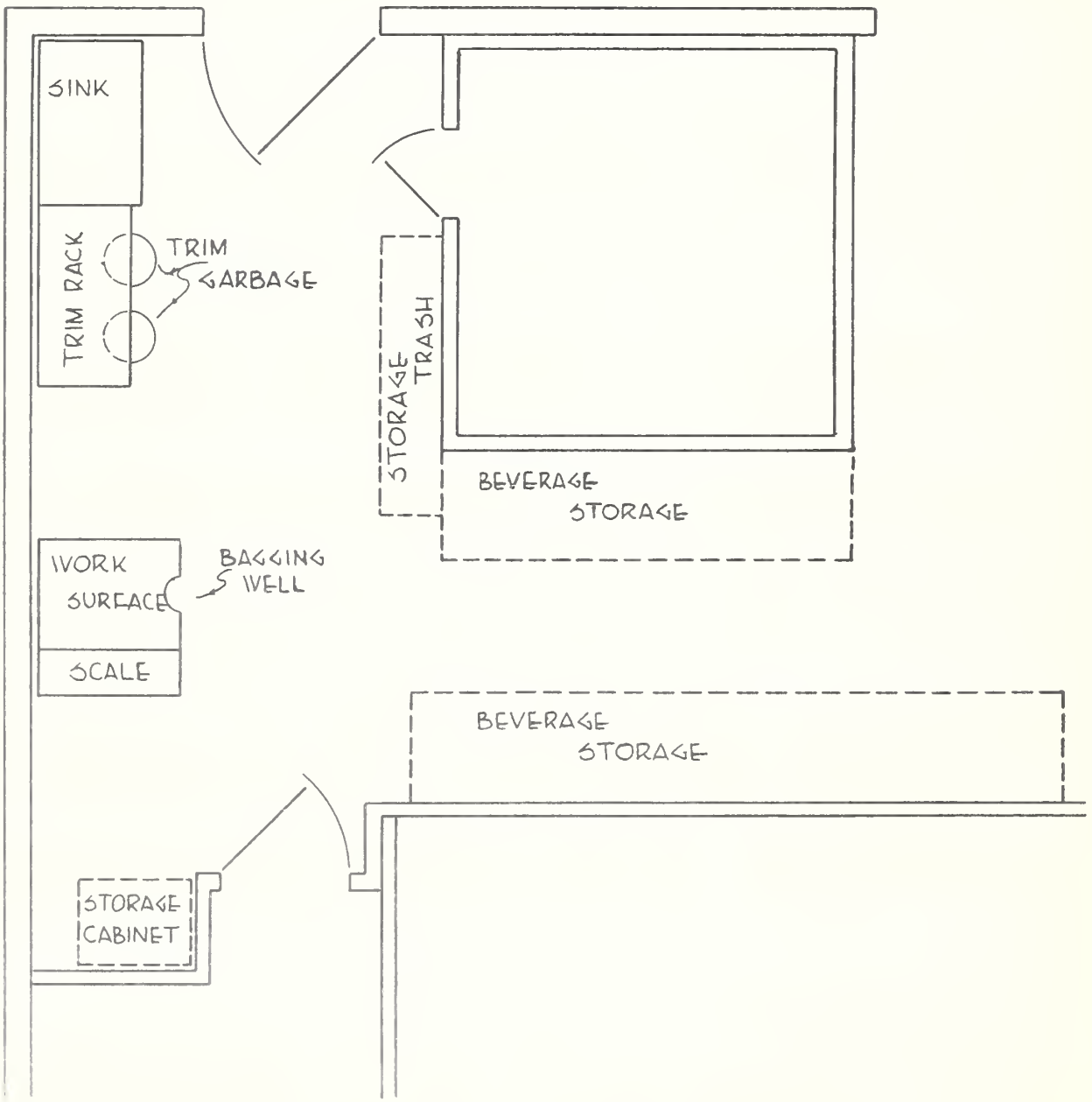


FIGURE 10

SUGGESTED PRODUCE PREPARATION ROOM

LAYOUT FOR BULK-TYPE SELLING



OPERATING PRACTICES IN THE PRODUCE DEPARTMENT

Problem	Recommendation
1. Produce department lacks "excitement." Layout contributes to this lack of eye appeal because potatoes and dried fruits are first items seen by the customer upon entering the department.	1. Remove potatoes and dried fruits from present location to end of suggested produce gondola (See Figure 4.) Replace with seasonal items mass displayed using overhead spotlights to brighten the display.
2. Small Displays. Many displays contained only a small amount of the item being displayed.	2. When necessary to stock only a few packages of a certain item, display this item together with other items stocked in small quantities.
3. Present handmade signs are not attractive.	3. Replace handmade signs with manufactured signs in two sizes. The smaller size to be used for items not being featured.
4. Produce ordering. Ordering is being done by means of telephone conversation which is probably more time consuming than mail-in ordering.	4. Use mail-in order forms to replace telephone calls.
5. Bottle return. Present methods of receiving and storing bottles in the produce department interferes with produce preparation work and often causes customers to wait.	5. Consideration should be given to establishing bottle receiving station at number 4 checkout. Bottles received could be stored in a four wheeled cart parked under the receiving counter. When filled, the cart could be wheeled directly to the bottle storage room.

OPERATING PRACTICES IN THE FROZEN FOODS DEPARTMENT

Problem	Recommendation
1. Defrosting of frozen foods because of excessive waiting period before storage or stocking.	1. Frozen foods should be moved directly from receiving conveyor to: (a) storage freezer, or (b) display cabinet. Movement should be direct to storage freezer unless stocking can be completed with 30 minutes after receiving.
2. Access to freezer storage. Elevated freezer floor prevents wheeling hand trucks or carts into the freezer.	2. Build ramp from floor level to freezer floor level. Future freezer construction should permit freezer floor to be the same level as store floor. Moisture barrier should then be constructed between freezer walls and floor.
3. Arrangement of freezer storage space. Items stored in freezer are not easily accessible.	3. Build shelving along sides and end of freezer. New items should be unloaded onto shelves from hand trucks wheeled into the freezer. Date received should be marked on the end of each new case placed in storage.
4. Frozen foods display lacked "excitement."	4. Locate featured frozen food item in center of the frozen food display. Similarly, locate high volume frozen orange juice near center of display, thus exposing more frozen food to customer traffic. Use point-of-sale signs, especially for featured frozen food items.
5. Inventory control. Appeared that some items were overstocked while others could benefit from larger facings.	5. Inventory turnover standards should be established for determining stocking and facings.

Problems	Recommendation
6. Rotation. Observed that no rotation plan was being followed when stocking frozen food cases.	6. When stocking frozen foods, follow a rotation plan such as moving items forward one week and backward the next. Lift out old stock and put new on the bottom when less than a row of the item is stocked.
7. Price marking. Many frozen foods on display had illegible price marks.	7. Price marking should be done at a price marking station located near the freezer. NCR stock type marking sets should be used instead of rotary stamp.1/

JOB DEFINITIONS

Brief interviews with full-time employees prior to the study indicated that line of authority in the store could be defined more clearly. Some of the departmental managers indicated that their orders came from specialists. The store manager, however, said that these persons reported directly to him.

Evidently the present informal organization of the store has overcome the conflict in delegation of authority because the store organization was observed to work in a highler satisfactory manner. However, the discrepancy between various employees' viewpoints on the line of authority could become important at some future date.

It is suggested that top management prepare position descriptions for all department heads in the store and the store manager. The position description should be used as basis for specifying authority and responsibility of the employee and for interviewing the employee at specific time intervals -- such as every six months. The written description should be reviewed at the time of the interview and rewritten following the interview if necessary. A copy of the position description should be given to the employees.

SUMMARY AND CONCLUSIONS

This supermarket represents an aggressive, progressive store. It is in a new building with new equipment operated by enthusiastic personnel who appeared to work together very well.

1/ Cf. Dale L. Anderson and Paul F. Shaffer, Improved Handling of Frozen Foods in Retail Stores, Marketing Research Report No. 105, (Washington: United States Department of Agriculture, 1955), p. 12. This report shows pictures of some price marking stations. See also: F. Miles Sawyer, Thaddeus F. Midura, Richard M. Vondell, Handling and Merchandising Frozen Food, (Amherst: University of Massachusetts, Cooperative Extension Service, 1960), 67 pp. Price marking techniques as well as many other aspects of retailing frozen foods are discussed in this publication.

The store was selling about $18,000 worth of goods each week. However, net profit was low, but the store was relatively new and still establishing itself in the market.

Labor as a percent of sales was within an acceptable range. However, labor productivity in terms of sales per man-hour in the grocery department was low, and wage cost per hour in the other departments was higher than should be expected. It appeared as though labor time was not being carefully accounted for in the various departments.

Inventory turnover was low in each department but the store was estimated to be at only 60 percent of capacity. Signs were not always on featured items. Trash accumulated in the storage room and in both produce and meat preparation rooms. The equipment, though new, was not always well adapted to do the job. A matter such as raising a work bench to a more convenient height was not done.

This report is not intended to be a complete blueprint for action. Costs of implementing recommendations have not been estimated; savings resulting from changes recommended have not been budgeted; break-even sales volumes have not been projected. Although incomplete, this report does point out the beginning of a systematic problem solving framework which this store could apply continuously. Steps in this framework could be described as: (1) analysis of present store situation; (2) recommendations for change based on the analysis; (3) adapting the recommended changes to the store; (4) analysis of the store situation after changes have been made. In this way, ideas can be tested, new problems and areas for research can be defined, and growth and development rather than repetition of mistakes can result from experience.

It would be hazardous to estimate the amount of savings to be realized from implementation of any or all of the changes discussed in this study. It seems reasonable, however, to imagine that the savings could be considerable.

The real savings, however, will come upon the drawing boards of stores to be built and run in the future. Identifying today's mistakes and problems is the first basic step to eliminating them in the future.

APPENDIX A

I. OPERATING DATA SUMMARY

A. Store area

Total store	10, 616 sq. ft.
Selling	6, 600
Office	135
Storage	3, 881

B. Weekly sales (average for the year) $18, 017

C. Linear feet of display

Grocery	637	72%
Meat	89	10%
F. Foods	23	2. 6%
Dairy	37	4. 2%
Produce	98	11. 1%

D. Weekly sales / linear foot of display

Grocery $\frac{\$648, 497}{52} = \frac{\$12, 471}{637 \text{ ft.}} = \$19.58$

Meat $\frac{\$227, 081}{52} = \frac{\$4, 367}{89 \text{ ft.}} = \$49.07$

Produce $\frac{\$61, 294}{52} = \frac{\$1, 179}{98 \text{ ft.}} = \$12.03$

Total $\frac{\$18, 017}{824} = \frac{\$18, 017}{824} = \$21.87$

II. DETERMINATION OF YEARLY INVENTORY TURNOVER IN THREE DEPARTMENTS

		Quarter 3	4	1	2	Total
A.	Groc. (beg. inv.)	26301	27406	32389	30732	116, 828
	Average					29, 207
	Groc. (end. inv.)	27406	32389	30732	31435	121, 962
	Average					30, 490

Average inventory: 59697 ÷ 2 = 29, 848

Cost of goods 540, 626

Inv. turnover (groc.) 540, 626 ÷ 29, 848 = 18. 11

B.	Meat (beg. inv.)	3079	2740	2708	2810	11337
	Average					2834
	Meat (end. inv.)	2740	2708	2810	2890	11148
	Average					2787

Average inventory: 5621 ÷ 2 = 2810

Cost of goods 181, 782

Inv. turnover(meat) 181, 782 ÷ 2810 = 67. 7

C.	Produce (beg. inv.)	999	1085	841	796	3721
	Average					930
	Produce (end. inv.)	1085	841	796	835	3557
	Average					889

Average inventory: 1819 ÷ 2 = 909

Cost of goods 45991

Inv. turnover(produce) 45991 ÷ 909 = 51

III. INVENTORY TURNOVER TOTAL STORE FOR FOUR QUARTERS

	Beginning Inventory	Average	Ending Inventory	Average
A. Grocery Dept.	26301		27406	
	27406		32389	
	32389		30732	
	30732		31435	
	116, 828 ÷ 4 = 29, 207		121962 ÷ 4 = 30, 490	
B. Meat Dept.	3079		2740	
	2740		2708	
	2708		2810	
	2810		2890	
	11337 ÷ 4 = 2, 834		11148 ÷ 4 = 2, 787	
C. Produce Dept.	999		1085	
	1085		841	
	841		796	
	796		835	
	3721 ÷ 4 = 930		3557 ÷ 4 = 889	
Total		32, 971		34, 166

Average 32, 971 + 34, 166 ÷ 2 = 33568

Total Cost of goods sold 768399

Inventory turnover 768, 399 ÷ 33, 568 = 22. 89

IV. ALLOCATION OF HOURS

A. Allocation of hours to the grocery department by quarters.

	3rd. quarter	4th. quarter	1st. quarter	2nd. quarter
Direct	3132	2865	3357	3077
Manager	182	182	182	182
Asst. Mgr.	715	715	715	715
Prod. Mgr.	221	221	221	221
	4250	3983	4475	4195
Less hours to:				
Meat Dept.	195	195	195	195
Prod. Dept.	195	195	195	195
	3860	3593	4085	3805 = 15343

B. Allocation of hours to the meat department by quarters.

	3rd. quarter	4th quarter	1st. quarter	2nd. quarter
Direct	1890	1518	1835	1709
Part-time	195	195	195	195
Total	2085	1713	2030	1904

C. Allocation of hours to the produce department by quarters.

	3rd. quarter	4th. quarter	1st. quarter	2nd. quarter
Direct	558	552	615	472
Part-time	195	195	195	195
Total	753	747	810	667
Less hours to:				
Groc. Dept.	221	221	221	221
Total	532	526	589	446

V. ALLOCATION OF WAGE EXPENSE

A. Allocation of wage expense to produce department.

1. Part-time help allocated to produce department: ($1.15 per hour)(15 hours per week)(13 weeks) = $224.25 per quarter.
2. Produce manager's salary allocated to grocery department: ($1.95)(17 hours)(13 weeks) = $430.95 per quarter.
3. Adjusted produce department labor expense by quarters.

	3rd. quarter	4th. quarter	1st. quarter	2nd. quarter
Direct	$1258	1021	1120	1205
Part-time	224	224	224	224
	1482	1245	1344	1429
Less time to:				
Groc. Dept.	431	431	431	431
	$1051	$814	$913	$998

B. Allocation of wage expense to meat department.

1. Part-time help allocated to meat department:
   ($1.15)(15 hours)(13 weeks) = $224.25 per quarter.
2. Adjusted meat department labor expense by quarters.

	3rd. quarter	4th. quarter	1 st. quarter	2nd. quarter
Direct	4266	3592	4303	3904
Part-time	224	224	224	224
	4490	3816	4527	4128

C. Allocation of wage expense to the grocery department.

1. Store manager.
   a. Hours per week allocated to the grocery department.

Area of Activity	Hours per Week
Dairy	4
Display and stocking	5
Sacking	1
Ice cream	2
Spices	1
Beer	1
Total	14

   b. Estimated hourly rate for manager: $2.25.
   c. Amount of manager's salary charged to grocery department:
      ($2.25)(14 hours)(13 weeks) = $409.50 per quarter.
2. Produce manager.
   a. Hours per week allocated to grocery department: 17.
   b. Estimated hourly rate: $1.95.
   c. Produce manager's salary charged to grocery department:
      ($1.95)(17 hours)(13 weeks) = $430.95 per quarter.
3. Assistant manager (estimated 55 hour work week).
   a. Total salary allocated to grocery department.
4. Adjusted grocery department labor expense by quarters.

	3rd. quarter	4th. quarter	1st. quarter	2nd. quarter
Direct	$3272	$2787	$3232	$2643
Asst. Mgr.	1430	1320	1540	1495
Mgr.	410	410	410	410
Prod. Mgr.	431	431	431	431
	$5543	$4948	$5613	$4979
Less time to:				
Meat Dept.	$224	$224	$224	$224
Prod. Dept.	224	224	224	224
	$5095	$4500	$5165	$4531

APPENDIX B

CUSTOMER SHOPPING PATTERNS IN SUPERMARKET "D"

Purpose of the Study

This study of customer shopping patterns recorded the frequency with which a sample of customers passed certain display areas as they made their shopping tour through store "D". The displays from which purchases were made were also recorded.

Since commodity categories are used as a means of attracting customers to various sections of the store, it is useful to know which commodity categories receive the most purchases. Sales from some commodity categories are generally believed to be related to customer exposure. Therefore, these displays should be located where customer traffic is heaviest.

Information on customer traffic routes in the store is helpful in determining the effectiveness of the store's layout. A basis is thus established for evaluating the location of display areas in present and future store layouts.

Methodology

An attempt was made to observe customers during one full week. The week selected did not contain unusual sales promotion. Customers were not observed on Tuesday. Two consecutive Friday afternoons were included. The intention was to observe 100 customers over the five day period. A total of 80 observations were made. The observations were made in the proportions shown in Table 4.

The results shown in Table 4 indicate that the proportion of customers sampled did not accurately reflect proportion of sales on Monday or Saturday. Proportion of weekly sales accounted for by days in the week was determined by averaging daily sales for the third week during the past six months. The difference between proportion of sales and proportion of observations on Monday was due to a miscalculation by the observer. The similar error on Saturday was due to a lack of observer time.

TABLE 4

DISTRIBUTION OF CUSTOMER OBSERVATIONS ON SPECIFIC DAYS COMPARED TO PROPORTION OF SALES OVER FIVE DAY PERIOD

	Proportion of Weekly Sales - Store A	Proportion of Observations Taken - Store A
Monday	6%	13%
Wednesday	20	17
Thursday	12	9
Friday	30	30
Saturday	32	11

The observation day was divided into equal time periods. The total customers to be observed were allocated to these time periods. An attempt was made to space the observations over the entire day. However, only Wednesday evening was included. The second customer entering after the time period had begun was the one observed. Thus, selection was made before the observer saw the customer to be observed. This procedure was intended to reduce bias in the selection of customers.

If customers showed an awareness of being watched, observations of them would cease, the worksheet being used would be discarded and another customer would be selected. One observation sheet was discarded because the observer lost the customer momentarily.

Customer awareness of being watched was not detected by the observer. However, one customer did ask a cashier if someone had been employed to watch the customers. This occurred during the evening observation period.

Each customer's route was drown on a diagram of the store's sales area. Figure 11 shows an example of the diagram used. The observer made a solid line on the diagram to mark the route taken by each customer.

Certain display areas are identified on the diagram. An "X" was used to mark each display area from which purchases were made. One "X" was used although several purchases might have been made from one display area.

One store diagram was used for each customer. After the last observation was completed, the results of all observations were tabulated. These results are shown in Tables 5 and 6.

Additional information emphasizing some characteristics of each customer is reported in Tables 7 - 13. When available, these results are compared to averages taken from other supermarkets.

The figures shown in Tables 7 - 13 indicate store "D" customers had smaller average orders and spent less time in the store. These results probably reflect the bias in the sample. A disproportionately large share of customers were observed early in the week. It is typical to have larger purchases later in the week.

Table 5 shows the frequency with which certain display areas were passed by customers. A color key is also shown which could be used for explaining Table 2 to an audience. Comparing the results in Table 5 with the linear footage shown for these displays in Figure 11, it can be shown that at least 50 percent of the customers passed approximately 30 percent of the linear feet of display in the store. The remaining 70 percent of the display footage was passed by fewer than 50 percent of the customers sampled. Commodities corresponding to the display numbers are shown in Table 7.

TABLE 5

PERCENT OF CUSTOMERS PASSING SPECIFIC DISPLAYS

IN STORE "D"

Percent	Display Numbers	Color Key
90	I.D. #1	Red
89-80	I.D. 4, I.D. 6&9, I.D. 12, 43	Pink
79-70	3, 7, 10, 14, 15, I.D.A, I.D.B, I.D.C, I.D.D, I.D.E, I.D.F, 19, I.D.37, 56, 69, 85	Gold
69-60	11, 96, 98-99	Brown
59-50	2, 8, 16, 17, 44, 49, 57, 94-95, 112, 113, 114, 18, 27, 36, 55, 66, 68	Green
49-40	28, 38, 39, 40, 41, 42, 45, 46, 47, 48, 50, 51, 52, 53, 54, 58, 59, 60, 63, 64, 65, 70, 71-73, 75-76, 77, 78, 79, 88-89, 91-92, 93, 83-84, 104-105, 115, 116, 121	Light Green
39-30	5, 20, 24, 25, 26, 29, 30, 31, 32, 33, 34, 35, 61, 62, 71-72, 80-81-82, 86-87, 90, 97, 100-101, 108-109, 111, 120	Blue
29-20	13, 21, 22, 23, 102-103, 106-107, 110, 119	Light Blue
19-10	117, 122	Grey
9	118	Black

Table 6 shows the percent of customers purchasing from specific display areas. At least 41 percent of those observed made purchases from display number 15, the bread and pastry display. Almost all displays had some purchases from them. Relatively few of the displays had purchases from them by more than 16 percent of the customers observed. Commodities corresponding to the display numbers are identified in Table 7.

FIGURE 11

EXAMPLE OF THE DIAGRAM USED TO MARK THE SHOPPING ROUTE OF EACH CUSTOMER OBSERVED

time in:
time out:
time in store:

check out:
time out:
time in:
order $:

type: m-f-c
list:
children: yes - no
one shopper:
two or more shoppers:

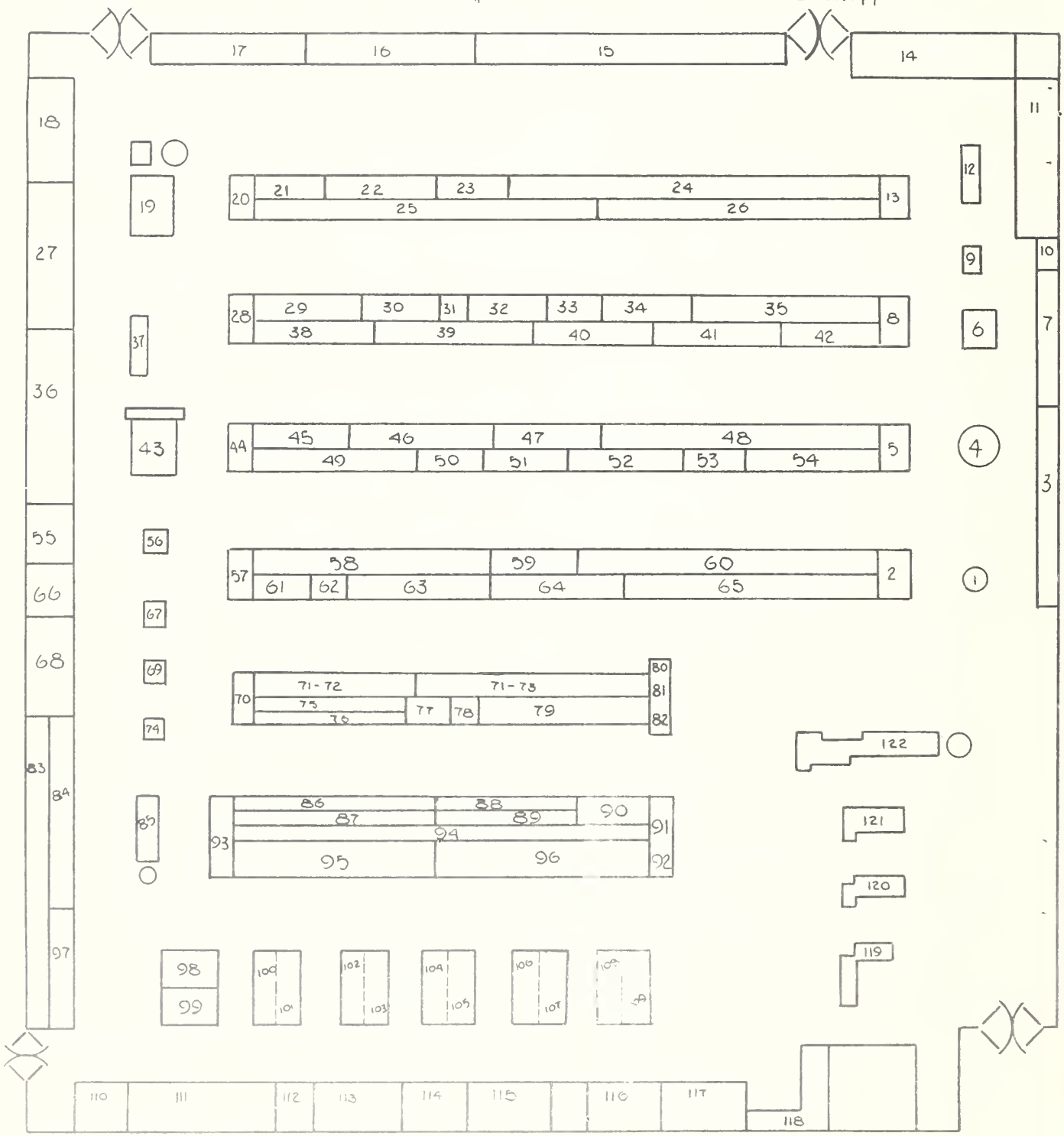


TABLE 6

PERCENT OF CUSTOMERS PURCHASING FROM
SPECIFIC DISPLAYS - STORE "D"

Percent	Display Numbers	Color Key
45-41	15	Red
40-36	11, 14	Pink
35-31		
30-26	96	Gold
25-21	3, 24, 114, 18, 27, 55	Brown
20-16	17, 25, 94-95, 104-105	Green
15-11	16, 19, 39, 47, 48, 52, 58, 60, 65, 71-73, 79 86-87, 91-92, 113, 115, 116, 36, 66, 121	Light Green
10-6	I.D. 4, I.D. 12, 13, 26, 28, 34, 35, 38, 46, 49, 50, 51, 53, 54, 59, 63, 64, 71-72, 93, 85, 108-109, 111, 112, 68, 119, 120, 122	Blue
5-1	I.D. 1, 2, 5, I.D. 6&9, 7, 8, 10, I.D. A,B,C,D, 20, 21, 22, 23, 29, 30, 32, 33, 40, 41, 42, 43, 44, 45, 46, 57, 61, 70, 75-76, 80-81, 82, 88-89, 90, 83-84, 97, 98-99, 100-101, 102-103, 106-107, 117-118	Light Blue
0	I.D. E,F, 31, I.D. 37, 75, 77, 78, 110	White

TABLE 7

PERCENT OF CUSTOMERS PASSING AND PERCENT OF CUSTOMERS PURCHASING FROM 122 DISPLAY AREAS IN STORE "D"

Display Number	Items	Percent Passing	Percent Purchasing
I.D. 1	Apples 4#/49¢	91	2
2	Dishes	55	1
3	Coffee, tea	74	22
I.D. 4	Coffee, 59¢	84	7
	Salad dressing, 4/1.00	-	-
5	Green Beans 7/1.00	38	-
	Green Beans 6/1.00	-	4
	Wax Beans 6/1.00	-	-
	Kidney Beans 10/1.00	-	-
	Chili Beans 10/1.00	-	-
I.D. 6&9	Pillows 88¢	82	4
	Pickles 2/49¢	-	-
7	Powdered milk	71	4
8	Milk drinks	-	-
	Catsup 6/1.00	51	5
	Apple Sauce 8/1.00	-	-
	Peaches 6/1.00	-	-
10	Canned milk	70	5
	Cheese in glass	-	-
	Cheese	69	36
	Margarine	-	-
	Eggs	-	-
	Rolls	-	-
I.D. 12	Cookies 39¢	81	6
13	Toilet tissue 12/1.00	26	6
	Shredded wheat 2/49¢	-	-
14	Milk, cream	76	39
	Butter	-	-
	Canned ham	-	-
15	Rolls	70	44
	Bread	-	-
	Pastry	-	-
16	Cookies, crackers	56	14
17	Cookies, crackers	55	16
I.D.A	Bread	78	5
I.D.B	Cake	78	1
I.D.C	Cookies	76	1
I.D.D	Cups	76	1
I.D.E	Cookies	75	-
I.D.F	Towels, brooms	75	-
19	Smoked meat	78	15
20	Beer, crackers	39	1

TABLE 7 (Cont'd)

Display Number	Items	Percent Passing	Percent Purchasing
21	Dietetic	25	1
22	Toys	28	1
23	Hot cereal	28	2
24	Prepared cereal	38	22
25	Vegetables	36	19
26	Fruits	36	10
28	Sugar	45	8
29	Preserves	36	4
30	Honey	36	5
	Peanut Butter	-	-
31	Olives	36	-
32	Pickles	38	4
33	Ketchup	38	4
34	Salad dressing	38	8
35	Juice	38	8
I.D. 37	Salad dressing	70	-
38	Spice	49	9
	Sugar	-	-
	Salt	-	-
39	Baking supplies	48	12
40	Syrup	45	5
	Pancake flour	-	-
41	Flour mixes	45	5
42	Flour	45	4
43	Fish	82	4
44	Personal	55	4
45	Household hardware	49	4
46	Baby food	49	10
47	Potatoe chips	45	12
48	Candy	46	15
49	Jello	51	10
	Macaroni	-	-
50	Spaghetti	48	6
	Prepared spaghetti	-	-
51	Tomatoe paste	48	8
	Prepared meat base	-	-
52	Canned meat	46	11
53	Fish	46	6
54	Soup	48	9
56	Waste baskets	76	1
	Baby clothes	-	-
57	Records	51	1
58	Pet food	46	11
59	Mix	45	6
60	Wine	48	12
	Pop	-	-
61	Household	38	1

TABLE 7 (Cont'd)

Display Number	Items	Percent Passing	Percent Purchasing
62	Brooms	38	1
63	Wax	40	7
	Laundry aids	-	-
64	Water softener	44	10
	Starch	-	-
65	Soap	41	14
	Liquid soap	-	-
69	Garden tools	75	-
70	Bulbs	49	1
71-72	Soap	36	7
	School supplies	-	-
71-73	Soap	41	12
	Clothing	-	-
75-76	Paper plates	40	4
	Napkins	-	-
77	Canning supplies	40	-
78	Paper sacks	40	-
79	Drugs	41	15
80-81-82	Tobacco	38	5
	Clothing	-	-
	Mouse poison	-	-
86-87	Toilet tissue	39	12
	Wrapping paper	-	-
88-89	Paper towels	41	2
	Face tissue	-	-
90	Personal products	39	1
91-92	Carton cigaretts	48	14
	Gloves	-	-
93	Shelled nuts	49	8
94-95	Household hardware	59	20
	Frozen food	-	-
96	Ice cream	65	28
83-84	Household hardware	45	5
	Frozen food	-	-
97	Frozen food	34	1
85	Florida oranges	75	6
98-99	California oranges	64	2
100-101	Grapefruit	32	4
	Miscellaneous	-	-
102-103	Apples	22	4
	Popcorn	-	-
104-105	Bananas	40	16
106-107	Candy	28	5
108-109	Onions	32	10
	Miscellaneous	-	-
110	Dried fruit	28	-
111	Potatoes	36	7
112	Celery	51	7

TABLE 7 (Cont'd)

Display Number	Items	Percent Passing	Percent Purchasing
113	Miscellaneous	56	11
	Vegetables	-	-
114	Lettuce	58	21
115	Miscellaneous	49	11
	Vegetables	-	-
116	Carrots	41	12
117	Beer, cooler	18	5
118	Beer, carton & case	5	5
18	Lunch meats	50	22
27	Frying meats	55	24
36	Roasting meats	58	11
55	Ground meat	56	22
66	Poultry	52	11
68	Variety meats	54	10
119	Gum, candy, cigarettes	24	9
120	Gum, candy, cigarettes	36	7
121	Gum, candy, cigarettes	40	12
122	Magazines, miscellaneous	15	9

TABLE 8

DISTRIBUTION OF SHOPPERS BY TYPE OF CUSTOMER -
STORE "D" COMPARED TO TWO OTHER STORES

Type of Customer	Percent of Customers	
	Store "D"	Other Two Stores
Female	60	52
Male	24	20
Couples	16	29

TABLE 9

AVERAGE SIZE OF ORDER BY TYPE OF CUSTOMER -
STORE "D" COMPARED TO TWO OTHER STORES

Type of Customer	Size of Order	
	Store "D"	Other Two Stores
Female	$ 8.38	$ 11.54
Male	3.42	8.74
Couples	11.24	12.43

TABLE 10

DISTRIBUTION OF SIZE OF ORDER -
STORE "D" COMPARED TO TWO OTHER STORES

Size of Order	Percent of Customers	
	Store "D"	Other Two Stores
Less than $ 3.00	35	13
3.00 - 4.99	14	13
5.00 - 9.99	22	32
10.00 - 19.99	20	29
20.00 and over	9	12

TABLE 11

AVERAGE TIME IN STORE BY TYPE OF CUSTOMER -
STORE "D" COMPARED TO TWO OTHER STORES

Type of Customer	Time in Store (minutes)	
	Store "D"	Other Two Stores
Female	16	23
Male	10	19
Couples	23	28

TABLE 12

DISTRIBUTION OF TIME IN STORE

STORE "D" COMPARED TO ONE OTHER STORE

Time in Store (minutes)	Percent of Customers Store "D"	Other ~~one~~ Store
Less than 10	30	16
10 - 15	34	22
16 - 20	9	12
21 - 25	9	18
26 and over	19	30

TABLE 13

DISTRIBUTION OF TIME IN CHECK LANE -

STORE "D" COMPARED TO ONE OTHER STORE

Time in Check Lane (minutes	Percent of Customers Store "D"	Other Store
1 minute or less	14	16
2 " " "	28	28
3 " " "	30	26
4 " " "	6	22
5 minutes and over	21	8