Labor Utilization and Operating Practices in Commercial Cafeterias

Marketing Research Report No. 824

Agricultural Research Service
United States Department of Agriculture

45 p.

N: Summary, p. 1-2.

Freshwater, J. F., Bouma, J. C., and Lammiman, R. M.
LABOR UTILIZATION AND OPERATING PRACTICES IN COMMERCIAL CAFETERIAS. U. S. D. A. Marketing Res. Rep. 824,45 p. Jan.1969. 1 Ag84Mr
Summary, p.1-2.

jm

A[MRR

Cafeterias

labor

0- 68-66

PREFACE

Material presented in this report was developed under contract by Horwath and Horwath, Management Advisory Services, Washington, D.C. James T. Matthews, Jr., and Vernon E. Cordell of the National Restaurant Association, Chicago, Ill., assisted the Department of Agriculture in planning the study and selecting the participating cafeterias.

The Research Committee of the National Restaurant Association assisted in planning the study and reviewing the findings. Special credit is due the owners and operators of the following 12 cafeterias who made their facilities available for detailed studies: Beadle Cafeteria, Pasadena, Calif.; Bishop Buffet, Bettendorf, Iowa; Britling Cafeteria Co., Memphis, Tenn.; Clifton's Cafeteria, West Covina, Calif.; Hot Shoppes, Inc., Washington, D.C.; Ken Johnson Cafeteria, Charlottesville, Va.; Luby's Cafeteria, Denver, Colo.; M.C.L. Cafeteria, Indianapolis, Ind.; Pennant Cafeteria, Topeka, Kan.; Pope's Cafeteria, St. Louis, Mo.; Putsch's Cafeteria, Kansas City, Mo.; and Oriole Cafeteria, Inc., Baltimore, Md.

The study was conducted under the general direction of R. W. Hoecker, Assistant Director, Transportation and Facilities Research Division, Agricultural Research Service.

Contents

Washington, D.C. Issued January 1969

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402—Price 50 cents

Labor Utilization and Operating Practices in Commercial Cafeterias

By JOHN F. FRESHWATER and JOHN C. BOUMA, *Transportation and Facilities Research Division, Agricultural Research Service* and ROBERT M. LAMMIMAN, *Horwath and Horwath* (Contractor)

SUMMARY

The findings of this study indicate that 18.9 productive man-hours per 100 customers served are required in single-line cafeterias and 17.5 productive man-hours per 100 customers served in double-line cafeterias. In single-line cafeterias, 79 percent of the man-hours are required for direct labor, which consists of meat and vegetable, warewashing, serving and utility, bakery, salad, and bus and tray departments. Double-line cafeterias require 73 percent of the man-hours for direct labor.

The average cafeteria in this study could reduce labor costs $35,600 annually through improved scheduling and supervision. These savings were developed from the 1967 operating statements of the firms which participated in the study. The potential direct labor savings for the single-line cafeterias is 19 percent and 30 percent for the double-line cafeterias through improved employee scheduling.

Employees in single-line cafeterias were scheduled 11 percent more effectively than those in double-line cafeterias. These percentages indicate that management had more effective control over labor costs when fewer employees were used. The lowest payroll ratio to sales (27 percent) was achieved by single-line cafeterias. This ratio underscores the advantage of more compact units in both employees' travel requirements and supervision.

Of the total productive time in direct labor, approximately 17 percent was spent in walking. This percentage represents the equivalent of nearly seven people walking continuously in the average cafeteria. These data indicate the need for the development of "self-contained" work centers designed for a worker using good work methods. The work center should provide the raw material, space, equipment, and other needs for the requirements of the menu.

Unique operating practices, such as the use of bus carts in clearing soiled tableware, rotary salad assembly table, soiled pots and pans conveyor, and order-call systems, indicate that substantial savings are available through the application of methods improvements. For example, study findings indicate savings of more than 5.5 man-hours per operating day by using bus carts in a 450 seat, 6,000 square foot dining room serving 1,980 customers per day.

Cafeterias that had formal training programs for employees achieved multiple job assignments with fewer employees. These cafeterias realized, on the average, a 3 percent less payroll ratio than cafeterias without training programs, with the resulting annual savings of $49,700 per average cafeteria studied.

The average labor performance for the bus and tray departments of the six single-line cafeterias was under 75 percent. In the six double-line cafeterias studied, it was under 75 performance for meat and vegetable, serving line and utility, bakery, and bus and tray departments. The foregoing performance statistics indicate that additional in-depth research should be focused in these areas for obtaining the greatest savings potential.

Almost all the newer cafeterias included in the study group were in the suburbs, primarily in shopping centers. This "move to the suburbs" has made possible more modern, casual decor and architecture. These new units are spacious, have impressive furnished interiors, divided dining spaces, and functional layouts, and generally use more labor-saving equipment than the older cafeterias.

The study revealed a wide range of variation in the key aspects of operating statistics for both single- and double-line cafeterias. The cafeterias with the greatest line speed (customers served per minute) and the highest food cost ratios to sales tended to have the highest check averages and sales volume. This finding tends to confirm the old axiom that the most successful food service operation is one with a relatively high ratio of food cost to payroll cost. No correlation of sales volume with seating capacity was apparent.

INTRODUCTION

Approximately 10 percent of the total wages paid in the food service industry is to cafeteria employees.[1] During calendar year 1967, these employees will have earned $397 million, and by 1971 this expenditure will increase to an estimated $594 million. The estimated increase of $197 million, or 50 percent, over a 4-year period is due to a 22-percent increase in hourly wage rates and a 28-percent increase in manpower required by an expanding industry. This study was sponsored by the U.S. Department of Agriculture in cooperation with the National Restaurant Association, in recognition of the necessity of increasing employee productivity as a result of escalating wage rates and a shortage of qualified personnel available to the food service industry.

The purpose of the study was to measure labor utilization and to obtain data on operating characteristics, facility layout, and operating methods in commercial cafeterias. These data may be used as a basis for determining the current level of labor utilization in any specific cafeteria compared with those cafeterias who participated in this research study and the potential savings available by improving management practices.

A meaningful productivity index had to be established to determine the labor utilization in a commercial cafeteria. Most cafeteria operators measure the effectiveness of their labor force with either the payroll ratio (payroll costs divided by gross sales) or sales per man-hour (gross sales divided by departmental man-hours). In the study reported here, the productivity index used was the number of man-hours by department to serve 100 customers. This index was used for two important reasons. The first was that by using man-hours rather than the payroll ratio, fluctuations in wage rates were eliminated. The second reason was that fluctuations in menu pricing were eliminated.

The objectives of this study were (1) to develop labor man-hours per 100 customers for single-line and double-line commercial cafeterias as a tool to improve scheduling, and (2) to evaluate operating methods observed in the 12 cafeterias to determine which were conducive to increasing labor productivity through better layouts, equipment, and work methods. The method utilized in determining man-hours per 100 customers is presented in appendix exhibit A.

Cafeterias were selected for the study on the basis of geographic location, whether single- or double-line operations, annual business volume, and profits.

The data were obtained from 12 commercial cafeterias—six single-line and six double-line. Only public commercial cafeterias were studied. University, hospital, employee, or other types of cafeterias were not included.

CHARACTERISTICS OF THE CAFETERIAS STUDIED

The basic operating characteristics of the 12 cafeterias studied are described in this section of the report; other details are given in appendix exhibit B. In each of the cafeterias, the food was well merchandised on the serving line, had excellent quality, and was served by attractively attired personnel.

Single-line Cafeterias

The basic operating statistics for the six single-line cafeterias (A through F) studied are shown in table 1. Cafeterias A, B, and F are single-unit operations, and C, D, and E are part of multiunit operations.

Cafeteria A has been operating for 2½ years in a shopping center in a community with a population of about 36,000. Cafeteria B is in the main business district of a city with a population of about 120,000. Cafeteria B has been serving the public at the same location for about 27 years. Cafeteria C, located in a community of more than 69.000 population, has been open since May 1965. This cafeteria is in a suburban shopping center that has a climate-controlled mall, 28 retail stores, and parking for 1,600 automobiles. Cafeteria D is

[1] The food service industry is comprised of business enterprises serving prepared food to the general public eating away from home.

TABLE 1.—*Basic operating statistics for the 6 single-line cafeterias studied*

Item	Unit	A	B	C	D	E	F	Average
Estimated annual sales.	Dollar	289,000	240,000	575,000	504,000	650,000	891,000	525,000
Average daily sales	do.	893	855	1,784	1,568	1,911	2,387	1,566
Average daily customer count.	Number	732	883	1,336	1,415	1,478	1,715	1,260
Check average	Dollar	1.22	0.97	1.34	1.11	1.29	1.39	1.22
Annual food cost ratio to sales.	Percent	38	37	33	39	38	41	38
Annual payroll cost ratio to sales.	do.	30	34	30	29	27	28	30
Maximum line speed observed (customers served per minute):								
Lunch	Number	4.7	5.8	5.0	5.2	6.6	5.7	5.5
Dinner	do.	3.2	2.6	5.3	4.9	5.3	5.4	4.5
Average line speed:								
Lunch	Number	1.6	2.7	2.5	3.3	2.5	3.0	2.6
Dinner	do.	1.4	1.7	2.9	3.5	3.0	3.1	2.6
Seating capacity	do.	332	300	262	249	200	227	262
Average daily seat turnover.	do.	2.2	2.9	5.1	5.7	7.4	7.6	5.2
Dining room area	Square feet	5,070	3,406	3,408	3,774	3,479	3,360	3,750
Proportion of space in dining room.	Percent	43.2	35.6	42.2	29.4	37.2	30.0	35.9
Kitchen, serving line, and other area.	Square feet	6,658	6,150	4,672	9,074	5,885	7,843	6,714
Proportion of space in kitchen, serving line, and other.	Percent	56.8	64.4	57.8	70.6	62.8	70.0	64.1

in an urban shopping center in a high-income residential area of a city of about 500,000 population. The cafeteria has been operating for about 3 years. Cafeteria E, in operation for about 2 years, is located in a city with over 750,000 people. Cafeteria F has operated for about 10 years in a city with a population of 130,000. This cafeteria is centrally located in the business district of a high-income area. Five other cafeterias are within a 10-block radius.

Double-line Cafeterias

The basic operating statistics for the six double-line cafeterias studied are given in table 2. Each of these cafeterias is part of a multiunit operation.

Cafeteria G has been operating for about 25 years in the main business district of a metropolis of more than 1.7 million population. An extensive urban renewal project has adversely affected this cafeteria's business because many firms in the area have been displaced. Patrons are primarily shoppers and business and professional people who are drawn from a 6-block radius. Cafeteria H, operating since May 1961, is in a community of about 30,000 population. The cafeteria is in an urban shopping center in an upper-middle-income residential section of the city. Cafeteria I, located in a metropolis with more than 1 million population, has been operating since May 1963. It is in an urban shopping center, in a medium-income residential section of the city. Situated in a midcity office building in a metropolis with more than 800,000 population, cafeteria J has been in operation since April 1960. It is serviced by a central commissary.

Cafeteria K has been operating for about 12 years in a city with a population of over 500,000. The cafeteria is in an urban shopping center in a middle-income residential area. More than 200 physicians and dentists and 150 retail stores are in the center. With its free parking, wide tree-lined boulevards, distinctive landscaping, and many fountains, as well as variety of stores, the center draws shoppers from all over the city.

Cafeteria L is located in a community with more than 75,000 population. This cafeteria has been serving the general public since 1958 and is located in a shopping center.

TABLE 2.—*Basic operating statistics for the 6 double-line cafeterias studied*

Item	Unit	G	H	I	J	K	L	Average
Estimated annual sales.	Dollar	406,000	785,000	800,000	850,000	1,371,000	1,022,000	872,000
Average daily sales	do.	1,565	1,991	1,980	2,263	4,078	3,745	2,604
Average daily customer count.	Number	1,941	1,459	1,818	1,933	3,113	2,549	2,136
Check average	Dollar	0.81	1.36	1.09	1.17	1.31	1.47	1.20
Annual food cost ratio to sales.	Percent	33	38	36	36	37	38	36
Annual payroll cost ratio to sales.	do.	38	30	30	44	33	30	34
Maximum line speed observed (customers served per minute):								
Lunch	Number	4.9	5.4	4.4	5.0	4.7	4.4	4.8
Dinner	do.	3.1	5.3	4.9	4.7	4.5	4.3	4.5
Average line speed:								
Lunch	do	2.3	1.9	1.9	3.5	3.6	2.7	2.7
Dinner	do.	1.7	2.9	2.9	3.4	3.4	2.5	2.8
Seating capacity	do.	402	315	469	496	424	452	426
Average daily seat turnover.	do.	4.8	4.6	3.9	3.9	7.3	5.6	5.0
Dining room area	Square feet	4,665	4,530	6,261	7,443	6,065	6,000	5,827
Proportion of space in dining room.	Percent	25.9	34.0	46.8	39.1	33.5	35.7	35.5
Kitchen, serving line, and other areas.	Square feet	13,330	8,804	7,120	11,605	11,949	10,805	10,603
Proportion of space in kitchen, serving line, and other.	Percent	74.1	66.0	53.2	60.9	66.5	64.3	64.5

MAN-HOUR REQUIREMENTS IN THE CAFETERIAS STUDIED

The history of measuring labor's productivity in American industry dates back to the 19th century. Productivity indices, when properly analyzed, provide the criteria for more perceptive and appropriate decisions involving the operations of a food service organization.

The immediate value of using these indices for evaluating the performance of employees is the determination of potential reduction of manpower requirements through better work scheduling and improved supervision.

Productivity measures provide management with information that is useful in two ways. First, they provide accurate data as to the amount of time various groups of employees spend in producing a finished product; and second, they can be used to determine the need or effect or both of methods improvements.

The development of man-hour requirements and an index of productivity will not, by itself, improve the operating efficiency of an organization. Productivity data do, however, provide an excellent factual framework upon which analysis and methods improvement can be based. Therefore, the reader should understand the nature, applicability, and limitations of the man-hour requirements developed in this study.

The industrial engineering technique used to develop the man-hour requirements in this study was work sampling. In the 12 participating cafeterias, the man-hour requirements to service 100 customers were developed for each department. These man-hour requirements reflect the actual operating conditions for the specific operation under study. Differences in work methods, menu requirements, type and condition of kitchen equipment, layout and design of work areas, the type of raw food ingredients purchased, and the quality and quantity of finished goods produced are a few of the variable factors having a significant impact upon these man-hour requirements.

The major areas of work were divided into the following departments: Meat and vegetable, warewashing, serving and utility, bakery, salad, bus and tray, management, storeroom, checker and cashier, night and/or repair. The first six departments—meat and vegetable through bus and tray—were considered direct

labor. A description of the work activities for each department and the method of determining labor requirements are given in appendix exhibits C and D.

Table 3 shows the actual and productive man-hours required per 100 customers by single- and double-line cafeterias in this study. Productive man-hours per 100 customers are the time requirements for employees to prepare, cook, and serve food, and to perform associated work to feed cafeteria patrons. Nonproductive man-hours per 100 customers are the hours that do not contribute to the production of the finished product, such as delays and lack of work. The information shown in table 3 is of value as a guide and for making rough comparisons since such information has not been previously available. These man-hour requirements reflect the actual operating conditions for the specific operation under study. Differences in work methods, menu requirements, type and condition of kitchen equipment, layout and design of work areas, the type of raw food ingredients purchased, and the quality and the quantity of finished goods produced are but a few of the variable factors that have a significant impact upon man-hour requirements.

Single-line cafeterias achieved the highest average performance of 84.4 percent. This might be attributed to the greater supervision possible in the smaller, single-line cafeterias. The man-hours shown in table 3 are averages for single- and double-line cafeterias studied. The man-hours for individual cafeterias are shown in appendix tables 12 and 13.

A comparison of the high- and low-productive man-hours per 100 customers, by department, for single-line cafeterias is presented in table 4. An 84-percent range was found between the lowest meat and vegetable department (cafeteria F) and the highest (cafeteria E). This difference was primarily the result of scheduling. The 49-percent range in the warewashing departments between cafeterias E and D reflected a better layout in E and not wrapping silverware. The 33-percent range between B and F in the serving and utility department was primarily because F offered a greater menu selection and had higher sales. The bakery in F (0.88 man-hours) required less man-hours than B (2.50 man-hours) because F used better work methods and had better baking equipment (a rotary oven). The difference between the salad departments of C (0.42 man-hour) and D (1.34 man-hours) primarily resulted from the menu selections offered and production methods used. (The 88.6-percent range in the bus and tray departments between C and D was the result of D providing most of its customers with an employee to carry their tray.)

A comparison of the high- and low-productive man-hours per 100 customers by department for double-line cafeterias is shown in table 5. The 132 percent difference between

TABLE 3.—*Productive* [1] *and actual employee man-hours per 100 customers for commercial cafeterias*

Department	Single-line cafeterias			Double-line cafeterias		
	Productive time	Actual time	Performance	Productive time	Actual time	Performance
	Man-hours	*Man-hours*	*Percent*	*Man-hours*	*Man-hours*	*Percent*
Meat and vegetable	2.80	3.30	84.8	2.10	2.90	72.4
Warewashing	2.56	3.10	82.6	2.17	2.86	75.9
Serving and utility	4.51	5.75	78.4	4.49	6.83	65.7
Bakery	1.65	1.85	89.2	.65	.96	67.7
Salads	1.04	1.20	86.7	.82	1.02	80.4
Bus and tray	2.38	3.19	74.6	2.61	3.78	69.0
Total, direct labor	14.94	18.39	81.2	12.84	18.35	70.0
Management	1.83	1.83	100.0	2.02	2.02	100.0
Storeroom	.39	.43	90.7	.33	.35	94.3
Checker and cashier	1.33	1.33	100.0	1.46	1.46	100.0
Night and/or repair	.41	.41	100.0	.82	.82	100.0
Total, direct labor	3.96	4.00	99.0	4.63	4.65	99.6
Grand total	18.90	22.39	84.4	17.47	23.00	76.0

[1] Productive time per 100 customers was developed by the application of work sampling percentages.

TABLE 4.—*Comparison of productive man-hours per 100 customers by department for single-line cafeterias*

Department	Low		High		Range	
	Cafeteria	Man-hours	Cafeteria	Man-hours	Man-hours	Percent
Meat and vegetable	F	2.22	E	4.09	1.87	84.2
Warewashing	E	2.15	D	3.21	1.06	49.3
Serving and utility	B	3.92	F	5.22	1.30	33.2
Bakery	F	.88	B	2.50	1.62	184.1
Salads	C	.42	D	1.34	.92	219.0
Bus and tray	C	1.85	D	3.49	1.64	88.6
Overall	C	12.70	D	16.61	3.91	30.8

TABLE 5.—*Comparison of productive man-hours per 100 customers by department for double-line cafeterias*

Department	Low		High		Range	
	Cafeteria	Man-hours	Cafeteria	Man-hours	Man-hours	Percent
Meat and vegetable	L	1.28	G	2.97	1.69	132.0
Warewashing	J	1.77	G	2.65	.88	49.7
Serving and utility	J	3.93	L	5.13	1.20	30.5
Bakery	G	.68	H	1.16	.48	70.6
Salads	L	.41	H	1.22	.81	197.6
Bus and tray	J	1.66	H	4.37	2.71	163.3
Overall	J	11.57	H	15.56	3.99	34.5

the 1.28 man-hours of cafeteria L and 2.97 man-hours for cafeteria G in the meat and vegetable department was attributable to layout and type of menu. Conditions that caused the 49.7 difference in the warewashing department and the 30.5 percent difference in the serving and utility department could not be determined from study results. The 70.6 percent difference between the bakery departments of G and H was due to equipment used and types of products. A 197.6 percent difference between the salad departments of L and H was primarily the result of the menu offered. The reason for the 163.3 percent difference in the bus and tray department could not be determined.

Since the scope of this report eliminated supervisory, storeroom, checkers, cashiers, and janitorial personnel from the work-sampling process, the most significant figures are the total for productive direct labor. Figure 1 indicates that as the kitchen area increases the man-hour requirements per 100 customers decrease.

This trend line reflects the findings presented in table 3. The smaller sized single-line cafeterias require 2.33 more productive man-hours per 100 customers of kitchen labor than the larger size double-line cafeterias.

As shown in table 6, the average cafeteria studied could conservatively reduce labor costs $35,600 annually through improved supervision and scheduling of work. In addition, operating costs could be reduced through more

TABLE 6.—*Potential savings available through improved supervision and work scheduling*

Cafeteria	Payroll ratio to sales	Labor utilization	Payroll ratio at 95% labor utilization	Potential annual savings
Single-line	*Percent*	*Percent*	*Percent*	*Dollars*
A	30.0	88.4	27.8	6,400
B	34.0	88.7	31.7	5,500
C	30.0	81.3	25.6	25,300
D	29.0	80.7	24.6	22,200
E	27.0	87.2	24.8	14,300
F	28.0	80.9	23.8	37,400
Weighted average	30.0	84.4	26.4	18,900
Double-line				
G	38.0	68.0	27.1	44,300
H	30.0	77.7	24.5	43,200
I	30.0	79.1	24.9	40,800
J	44.0	70.5	32.6	96,900
K	33.0	77.6	26.9	83,600
L	30.0	86.5	29.3	27,600
Weighted average	34.0	75.8	27.1	60,200
Overall weighted average	32.0	79.9	26.9	35,600

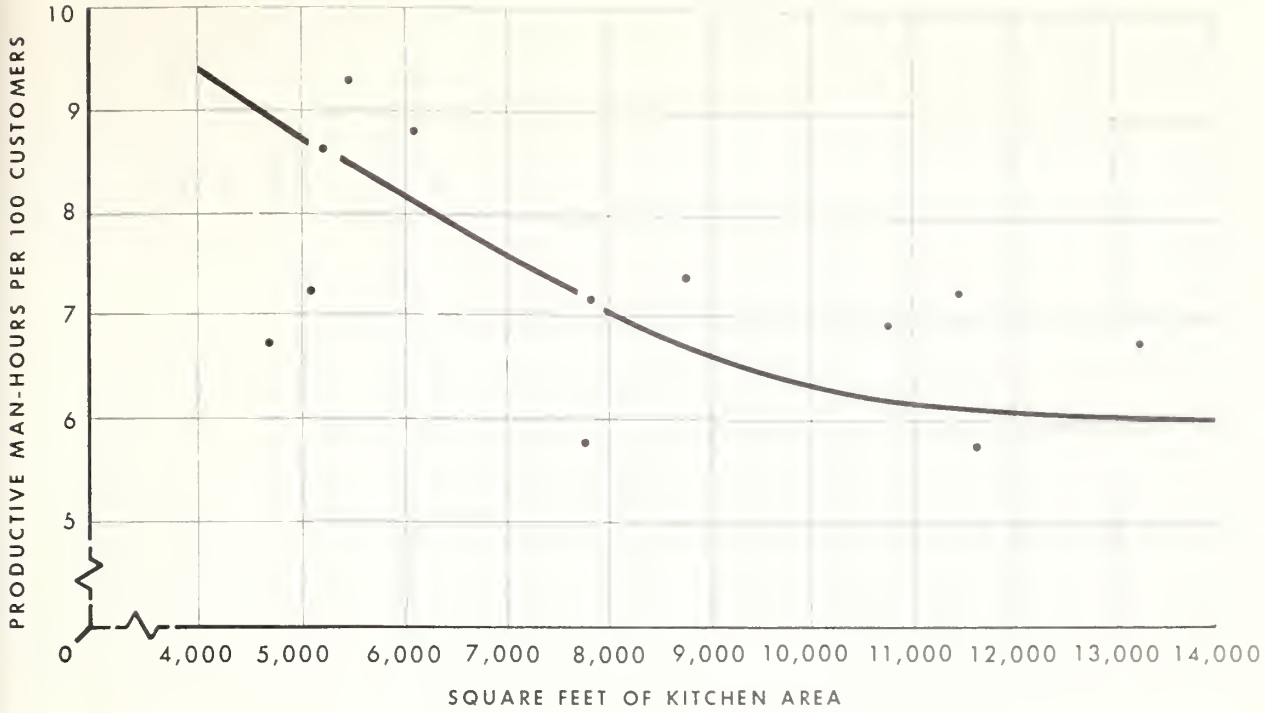


FIGURE 1.—Trend of kitchen employee man-hours by size of kitchen.

efficient kitchen design and equipment layout, better training of employees, and improved work methods. Tables 12 and 13 show that the average performance for direct labor is about 81 percent in single-line cafeterias and 70 percent in double-line cafeterias.

Proportion of Time Spent in Walking

This study has highlighted the importance of walking upon labor productivity. Of the total productive time, approximately 17 percent was spent in walking (table 7). This means that if the activity of 39 employees in an average cafeteria, were observed simultaneously seven of these employees would be walking.

It was beyond the scope of this study to evaluate the impact of methods, improvements, and changes in layout design on travel requirements. This would require an in-depth analysis in each cafeteria. Such an analysis was made by the U.S. Naval Supply Research and Development Facility (*1*) at Bayonne, N.J., which determined the cook's travel requirements in a Tang class submarine.[2] Comprehensive studies in industrial engineering were conducted of the food preparation for 16 days. The findings were stated as follows:

> The aggregate total distance moved in the existing galley layout during the test was 44,428.4 feet. The aggregate total distance moved in the proposed layout is calculated to be 30,138.7 feet. Thus a potential saving of approximately 32.2 percent in distance moved is indicated.

TABLE 7.—*Proportion of time spent walking in the cafeterias studied*

Cafeteria	Daily direct labor time	Time required for travel		Distance traveled per day
		Total	Percentage of total	
	Man-hours	*Man-hours*	*Percent*	*Miles*
Single-line				
A	126.37	30.58	24.2	91.7
B	150.54	37.18	24.7	111.6
C	214.76	45.96	21.4	137.8
D	306.02	40.70	13.3	121.1
E	276.74	44.28	16.0	132.8
F	333.60	74.39	22.3	223.2
Double-line				
G	417.74	61.41	14.8	184.2
H	320.39	65.04	20.3	195.1
I	304.33	63.60	20.9	190.8
J	352.27	58.83	16.7	176.5
K	525.96	59.43	11.3	178.3
L	374.46	89.50	23.9	268.5
Average	308.60	51.91	16.8	155.7

[2] Italic numbers in parentheses refer to Literature Cited, p. 30.

Determining Guideline Labor Requirements for a Cafeteria

The productive man-hours per 100 customers served that have been developed in this study may be used to compare the performance of employees in other cafeterias. In making such comparisons, it is necessary to consider that each operation is somewhat different in such things as menu, layout and equipment, levels of employee training, and work methods. Nevertheless, such a comparison will probably provide the knowledgeable operator with an initial tool to increase the employees productive time.

The first step is to determine the number of customers served for a typical week's operation. The number of payroll hours incurred *for that week's operation* should then be broken down by department.

For example, in this study the man-hour requirements for a 260-seat, single-line cafeteria will be determined (table 8). The cafeteria is located in a suburban shopping center; its patrons consist primarily of median-income shoppers. This cafeteria has annual sales of $550,000, a payroll ratio of 31 percent, and a food cost ratio of 34 percent.

The productive man-hours per 100 customers, shown in table 3, are recorded in column 1 of table 8.

A summary of the week's sales from the cashier reveals that 10,345 customers were served; therefore, 103.45 (10,345 ÷ 100) is recorded in column 2 of table 8. The productive man-hours per 100 customers in column 1 are multiplied by the number of hundreds of customers per week in column 2 to derive the productive man-hours per week in column 3. The number of payroll hours was summarized from the time cards by department according to the categories shown in table 8 and recorded as shown in column 4. The productive man-hours per week (column 3) divided by the actual man-hours per week (column 4) yields the performance (column 5).

Table 8 indicates that the overall performance for the direct labor departments is 79.8 percent. The warewashing department with a 79.3-percent performance, salad department with a 74.2-percent performance, and the bus and tray department with a 70.4-percent performance have a substantial impact on the overall performance. Any department that does not have a percentage performance of 100 should be analyzed in an effort to increase its productivity. The owner or manager or other authorized person needs to review the operating practices in these departments and make improvements.

Scheduling Employees

Careful scheduling of employees to match their work requirements is an effective method for reducing labor costs. Management must develop time standards for the performance of specific production tasks for effective scheduling. When operating management is provided with this tool, a detailed work schedule can be

TABLE 8.—*Example of productive man-hours per 100 customers required per week for a single-line cafeteria*

Department	(1) Productive man-hours	(2) Number of customers per week divided by 100	(3) Productive man-hours per week (1) x (2)	(4) Actual man-hours per week	(5) Performance (3) ÷ (4)
	Man-hours	*Number*	*Man-hours*	*Man-hours*	*Percent*
Meat and vegetable	2.80	103.45	289.66	338.0	85.7
Warewashing	2.56	103.45	264.83	334.0	79.3
Serving and utility	4.51	103.45	466.56	566.2	82.4
Bakery	1.65	103.45	170.69	203.9	83.7
Salad	1.04	103.45	107.59	145.0	74.2
Bus and tray	2.38	103.45	246.21	349.7	70.4
Total direct labor	14.94	103.45	1,545.54	1,936.8	79.8
Management	1.83	103.45	189.31	198.0	95.6
Storeroom	.39	103.45	40.34	48.0	84.1
Cashier and checker	1.33	103.45	137.59	140.0	98.3
Nightman or repairman	.41	103.45	42.41	48.0	88.4
Total indirect labor	3.96	103.45	409.65	434.0	94.4
Total	18.90	103.45	1,955.21	2,370.8	82.5

TO ACCOMPANY JOB DESCRIPTION NO. BB-1 FOR (Name) John Murphy CLOCK NO. 12

DATE Sept. 1 1967

INSTRUCTIONS

You are directed to perform the duties provided for in your Job Description during the time and on the day of the week indicated in this schedule, unless specifically directed otherwise by your supervisor. If you are unable to perform any indicated duty at the time and on the day indicated, it is YOUR RESPONSIBILITY to notify your supervisor BEFORE the day or time the duty is scheduled to be performed in order that other arrangements may be made to perform that duty. This schedule does NOT prevent your supervisor from altering it or assigning different or additional duties as may be necessary to provide for the effective use of manpower in your department.

From To Time	Day: Tues. DUTY	From To Time	Day: Wed. DUTY	From To Time	Day: Fri. DUTY	From To Time	Day: Sat. DUTY	From To Time	Day: Sunday DUTY
a.m. 6:30 to 7:00	Your breakfast		SAME AS TUES-DAY except– Dismantle & clean serv. sta. 3 & 4		SAME AS TUES-DAY		SAME AS WEDNES-DAY	a.m. 7:30 to 8:00	Your breakfast
7:00 to 10:00	Bus dishes, clear & set-up tables, supply serv. sta.							8:00 to 11:00	Bus dishes, clear & set-up tables, supply serv. sta.
10:00 to 11:00	Sweep DR floor Dismantle & clean serv. sta. 1 & 2							11:00 to 11:30	Sweep DR floor
11:00 to 11:30	Your lunch							11:30 to 12:00	Your lunch
11:30 to 2:00 p.m.	Set up serv. sta. 1 & 2, fill & ice water pitchers, Bus dishes, clear & set-up tables, assist waitresses.							12:00 to p.m. 3:00	Set up serv. sta. 1 & 2, fill & ice water pitchers, bus dishes, clear & set-up tables, assist waitresses
2:00	Sweep DR floor							3:00	Sweep DR floor
2:30	Straighten & aline furniture							3:30	Straighten & aline furniture
2:30	Off							3:30	Off

NOTE: We are closed on Mondays. Your day off is THURSDAY.

(SIGNED) _____
SUPERVISOR

FIGURE 2.—Detailed work schedule.

developed for each employee based upon production requirements for the period.

An example of a detailed work schedule for a bus boy is shown in figure 2. A detailed work schedule similar to that illustrated in figure 2 was effectively utilized by cafeteria B. Upon completion of the detailed work schedule for each employee, a weekly department schedule can be prepared. An example of a weekly work schedule by department is shown in figure 3. This schedule was developed and used by cafeteria D.

CAFETERIA LAYOUT AND EQUIPMENT SUGGESTIONS

The layout and design of a cafeteria affect its operating efficiency. A good design, based on the potential sales of the market area, should minimize repair and maintenance costs and the labor required to operate the cafeteria.

An operator may obtain help in constructing or remodeling a cafeteria from qualified food facilities layout engineers, consulting firms, engineering firms, and kitchen equipment contractors. Before entering into an agreement with a consulting firm or a contractor, the prospective builder should obtain a feasibility study and become knowledgeable in the fundamentals of good layout design (*2; 3; 4; 6, pp. 23-24*) as presented in this report. The feasibility study, if well designed and executed, will answer the basic question: Should the project be undertaken?

Source: Welch (7).

DEPARTMENT Dining Room

EMPLOYEE NAME	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
John Murphy	7:30 a.m. 3:30 p.m.	Closed	6:30 a.m. 2:30 p.m.	6:30 a.m. 2:30 p.m.	OFF	6:30 a.m. 2:30 p.m.	6:30 a.m. 2:30 p.m.

FIGURE 3.—A weekly work schedule for cafeteria employee by department.

Preliminary Design

After a reputable authority determines that the proposed construction is economically feasible, the space required for the cafeteria can be developed. Table 9 shows the average square footage by functions for the cafeterias participating in this study. Tables 14 and 15 show the area by department for each of the cafeterias. The space requirements should be submitted to an architect to incorporate into the preliminary design of the building.

Planning critieria developed in the study that might be helpful in designing a cafeteria are as follows:

—Reducing employee travel through proper layout.

—Determining seating capacity from an estimate of customers leaving the serving line per minute and seat turnover.

—Providing about 14 square feet of area per seat in an average dining room.

—Allowing about 36 percent of the total area for dining; 8 percent for customer waiting; 10 percent for the serving line; 5 percent for the dishroom and washing pots and pans; and about 7 percent for the meat and vegetable cooking and preparation departments.

The layout plans will show the overall building design and the location and relation of departmental production areas that establish the major employee traffic patterns. The study shows that the planning goal should be to locate the three major departments—meat, vegetable, and salad preparation—directly behind the serving line where these products are to be displayed, or else undesirable cross traffic will result.

The interior decor and atmosphere of the dining area should enhance dining pleasure. A professional designer can often develop the operator's ideas as the basis for decor of this area. The architect or consultant may also have suggestions as to interior design and is often able to recommend experienced decorators. In designing the dining area, space should be provided for serving stations which dispense such items as condiments, water, ice, and glasses.

The following criteria should be considered in the kitchen design.

—Proper lighting, air-temperature control, and noise control. These factors are most important to the attainment of high productivity of employees.

—Floors and walls of nonporous material for ease in cleaning.

—Drains of adequate number and size for proper cleaning of kitchen floors.

—Nonskid materials on the kitchen floor in main traffic aisles to minimize accidents when floors are wet.

—Stainless steel range hoods with remov-

TABLE 9.—*Average cafeteria areas and area ratios for single- and double-line cafeterias*

Area description	Single-line cafeterias			Double-line cafeterias		
	Average area	Ratio of area to total	Area per seat	Average area	Ratio of area to total	Area per seat
	Sq. ft	*Pct.*	*Sq. ft.*	*Sq. ft.*	*Pct.*	*Sq. ft.*
Dining room	3,750	35.9	14.3	5,827	35.5	13.7
Customer waiting	786	7.5	3.0	1,138	6.9	2.7
Serving line and cashier	986	9.4	3.8	1,663	10.1	3.9
Dishroom	427	4.1	1.6	512	3.1	1.2
Pots and pans	147	1.4	.6	175	1.1	.4
Meat and vegetable cooking	533	5.1	2.0	691	4.2	1.6
Meat and/or vegetable preparation	286	2.7	1.1	246	1.5	.6
Salad	260	2.5	1.0	343	2.1	.8
Bakery	527	5.0	2.0	465	2.8	1.1
Walk-in coolers	265	2.5	1.0	373	2.3	.9
Storeroom	431	4.1	1.6	773	4.7	1.8
Trash room	82	.8	.3	148	.9	.3
Equipment room	247	2.4	.9	452	2.8	1.1
Receiving dock	103	1.0	.4	266	1.6	.6
Office	113	1.1	.4	186	1.1	.4
Customer restrooms	286	2.7	1.1	313	1.9	.7
Employees' lounge and lockers	592	5.7	2.3	923	5.6	2.2
Miscellaneous aisles, etc.	643	6.1	2.5	1,936	11.8	4.5
Total	10,464	100.0	39.9	16,430	100.0	38.5
Average seating capacity		262			426	

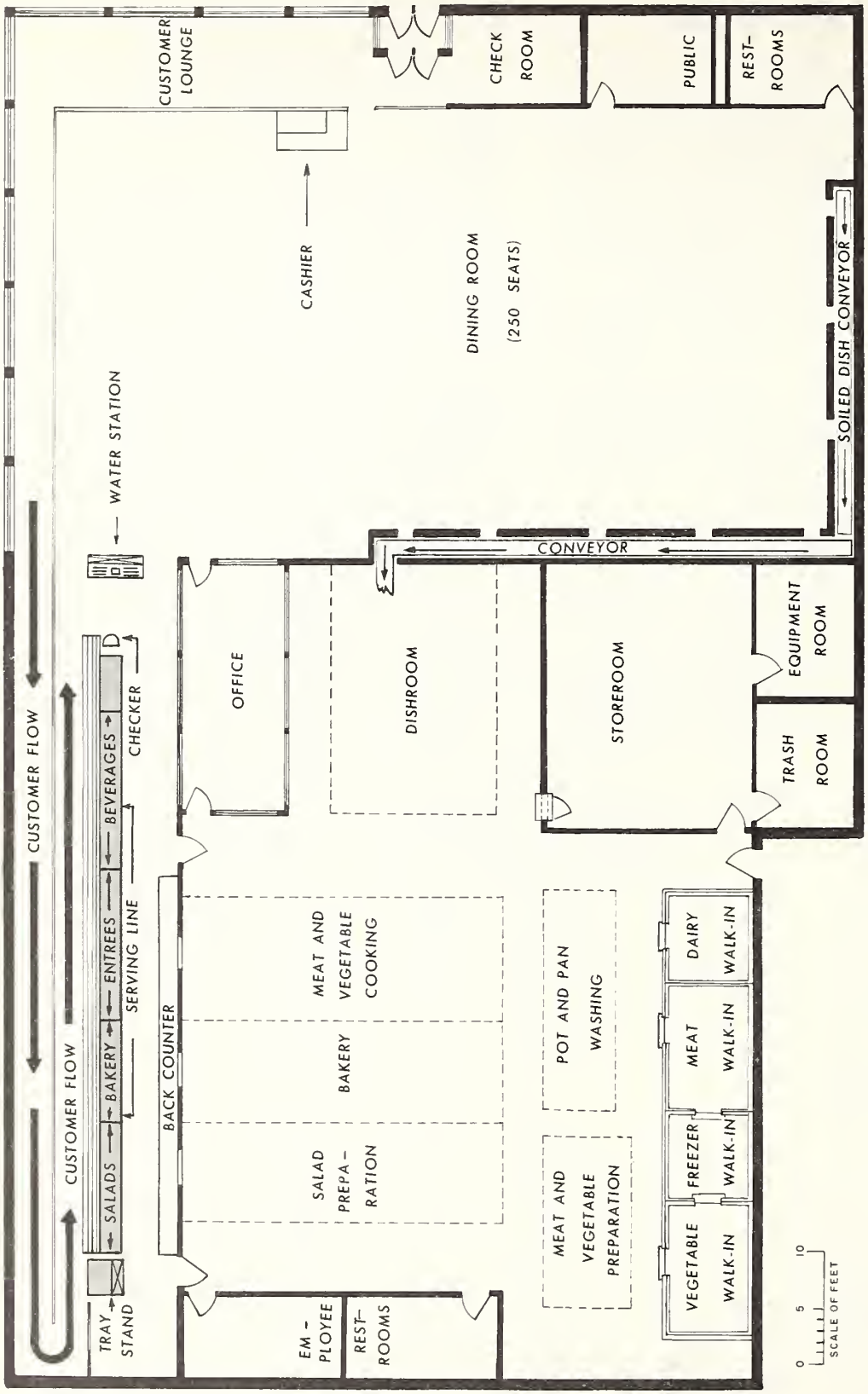


FIGURE 4.—A single-line cafeteria layout.

able grease filters for easy cleaning. Hoods are available that have built-in automatic cleaning devices.

—Equipment that is easy to clean and maintain. Equipment should be set flush with the wall and floor, or installed so that enough space is left behind or under it for proper cleaning.

—Refrigerators with portable metal shelves should be arranged so that the shelves can be moved into and out of the refrigerator for easy cleaning.

A Single-Line Cafeteria Layout

In the single-line cafeteria plan (fig. 4), the customer is able to preview the serving-line selection before he starts to select his food. This opportunity to preview the food selection tends to increase line speed. Items with a higher percentage of profit, such as salads and pastries, are often displayed first. These items, to some degree, represent impulse purchases. The hot entrees are usually next on the line, followed by the beverage station. The food production areas, located directly behind the serving line, are connected by refrigerated or heated pass-through units.

The pots and pans washing area is directly behind the bakery and meat and vegetable cooking departments since these two functions produce most of the soiled pots and pans.

Straight-line flow is accomplished from the receipt of raw material, transportation to refrigerated storage or the storeroom, and through the preparation and cooking areas to the serving line. This type of design reduces backtracking and cross traffic.

Proper location of the storeroom is important. A storeroom that is easily accessible will reduce travel time. The storeroom shown in figure 4 is located adjacent to the equipment room, trash room and receiving area. The entrances to the storeroom should be equipped with locks for proper security.

The location of public restrooms is important. Many of the participating cafeteria operators thought that public restrooms should be located between the public entrance door and the first station on the serving line. They thought that this location tended to reduce the possibility of "walkouts."

A Double-Line Cafeteria Layout

The design criteria for a double-line cafeteria usually depends upon whether the operation will be located on one or two floors.

Of the six double-line cafeterias studied, three had food production facilities located on the same floor as the dining room and serving lines and the rest had two floors. The primary advantage of a single-floor operation compared with a two-floor or multilevel one is that the handling requirements for raw material and finished goods between floors are eliminated. In addition, no capital investment is needed for dumbwaiters or vertical conveyors and their associated maintenance expense.

The advantages of the two-floor operation are as follows:

—The customer flow to both serving lines is not interrupted by product flow from the kitchen.

—Straight-line production flow between the kitchen and serving lines is maintained.

—In most shopping centers, a premium price is commanded for ground-level space.

The average direct labor, productive time requirements per 100 customers, for the single-floor cafeterias (table 13—cafeterias H, I, and L) is 3.47 man-hours, whereas 12.19 man-hours are required for the two-level operations (cafeterias G, J, and K). Thus the findings of this research indicates that two-floor cafeterias require 1.28 productive man-hour less than comparable single-floor operations.

The layout for the double-line cafeteria is illustrated in figure 5. The food preparation area is located in the basement. Raw material is transported from the freight elevator to the walk-in refrigeration units and storeroom. Straight-line product flow is accomplished from the storage areas through the production department. The finished products from the salad, bakery, and meat and vegetable cooking departments are transported to the serving line by three dumbwaiters, one from each department. These production areas and connecting dumbwaiters are located directly beneath the serving-line sections where the corresponding product is merchandised. This type of design reduces backtracking and cross traffic.

The customer, upon entering the cafeteria, is able to preview the serving line selection before he starts to select his food. This merchandise feature, the opportunity of previewing the food selection, tends to increase line speed.

There is no single plan for a cafeteria layout. The layout and design of every food service facility should be related to its myriad economic and operational requirements. These requirements differ substantially in menu requirements, market potential, and operating methods.

Work Station Layouts

This study has demonstrated an important aspect of layout and design—that of travel re-

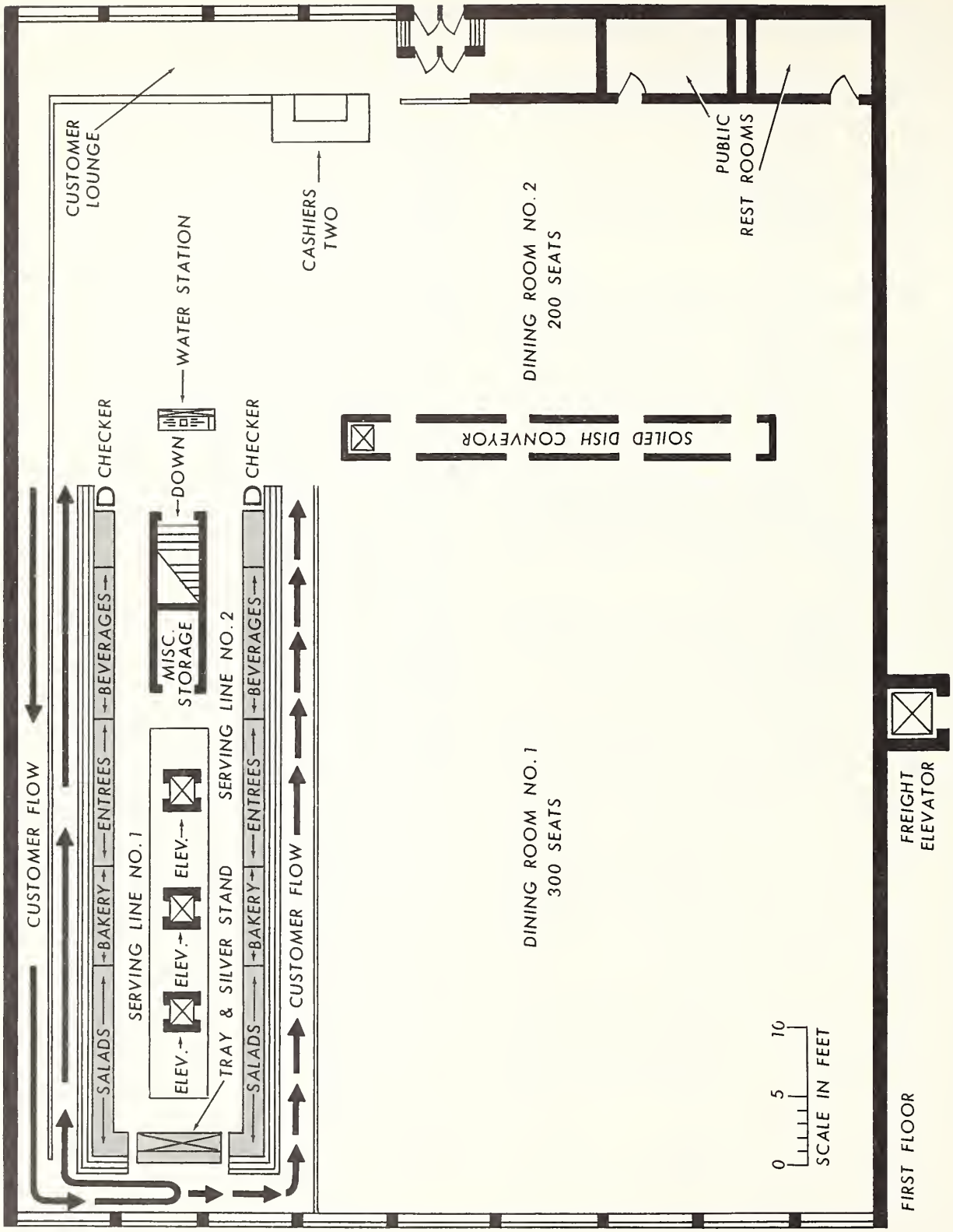


FIGURE 5A.—Layout of serving line and dining area of a double-line cafeteria.

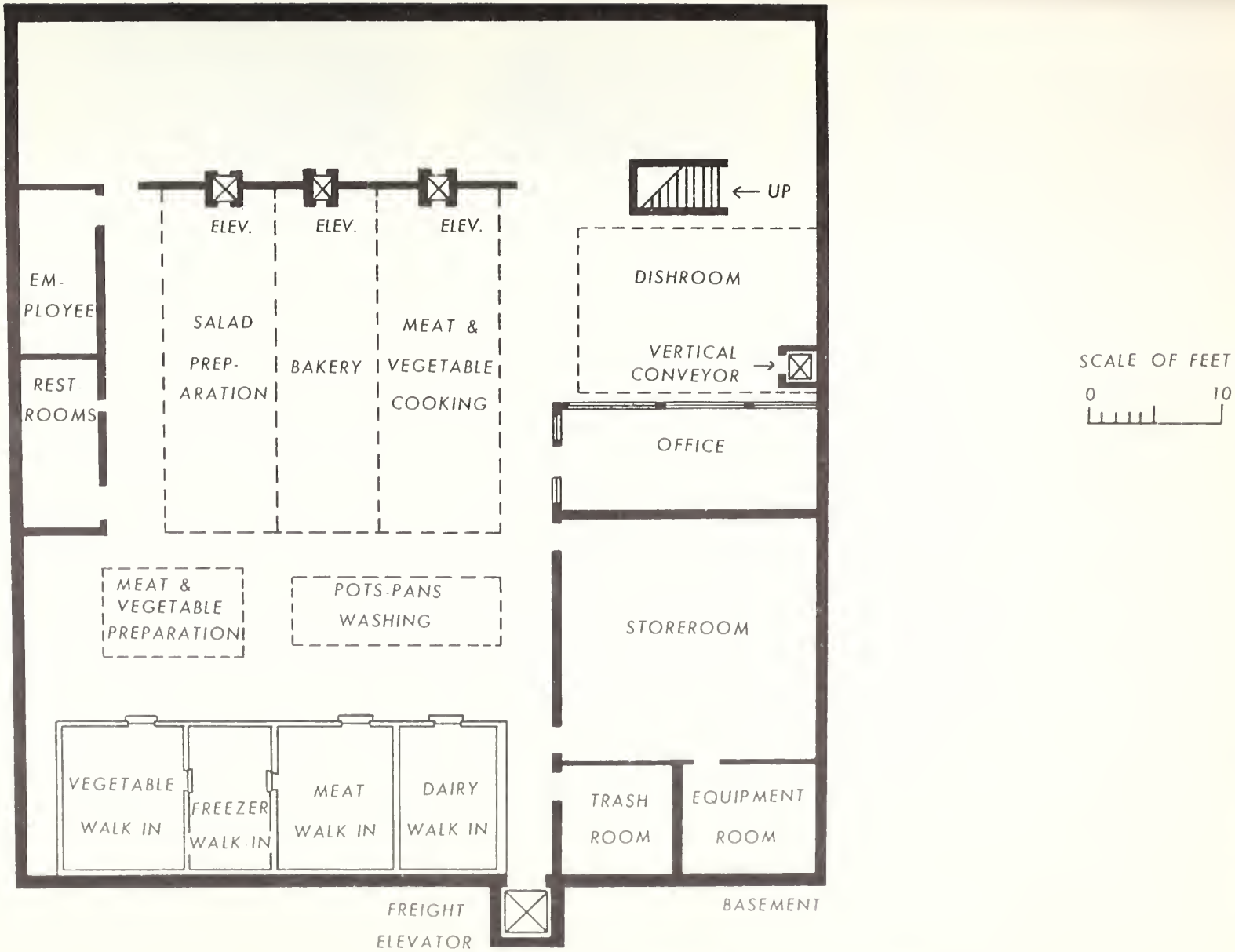
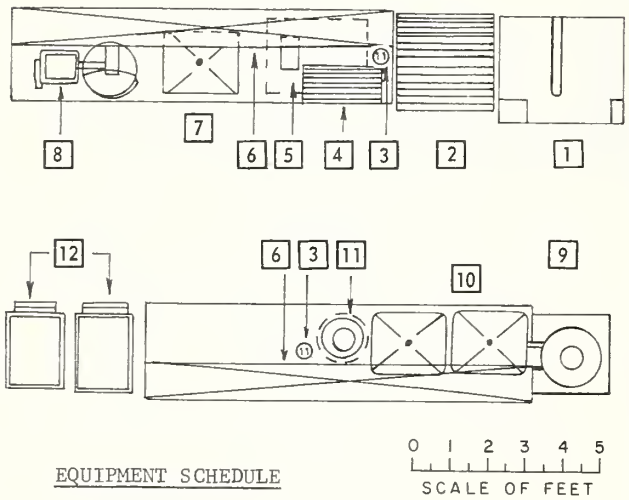


FIGURE 5B.—Layout of food preparation and storage area of a double-line cafeteria.

quirements imposed on employees. Of the total productive time, approximately 17 percent (table 7) is spent in traveling or walking. Part of this travel time is excessive. It is accounted for by poor overall layout of the cafeteria and improper design of individual work stations. The more time that is spent in traveling, the less is spent in productive work.

The recommended concept for an efficient cafeteria layout is one in which continuous product flow can be realized. In a cafeteria, product flow should be in a direct continuous path from the receiving and storage area, through production, to the serving line. Another desirable goal is reducing the number of times employees must handle the product.

The following schematic layouts were taken, with some modification, from departmental work stations that worked well in actual operation in the cafeterias studied. As in the planning of the functional relation of the total space to be used, there is no "ideal" department layout, since it must relate to the many specific requirements of a proposed operation.



EQUIPMENT SCHEDULE

1.....MEAT SAW
2.....BUTCHER'S CHOPPING BLOCK
3.....KNIFE WELL (2)
4.....RECESSED CUTTING BOARD
5.....GARBAGE DISPOSAL 3 HP. (HAMMERMILL TYPE)
6.....OVERSHELF (2)
7.....MEAT PREPARATION TABLE WITH SINGLE-COMPARTMENT SINK
8.....FOOD CHOPPER
9.....VEGETABLE PEELER
10.....VEGETABLE PREPARATION TABLE WITH DOUBLE-COMPARTMENT SINK
11.....GARBAGE DISPOSAL UNIT 2 HP.
12.....CARTS (2)

FIGURE 6.—Meat and vegetable preparation layout.

Meat and Vegetable Preparation

Figure 6, a representative layout of meat and vegetable preparation, is an example of straight-line product flow in a production area. Fresh meat and vegetables are brought to this area from the walk-in coolers and freezer.

The vegetable peeler is located so that it discharges into the sink. This enables employees to place a colander into the sink to allow the peeled product to drain. The food chopper (item 8, figure 6) is portable and can be moved between the two work stations. Knife wells are provided in the table for accessibility to cutting tools. The disposal units (items 5 and 11) eliminate the need for garbage cans, which are usually placed in the aisles and reduce usable space. Overshelves are provided on worktables for utensil and condiment storage.

Meat and Vegetable Cooking

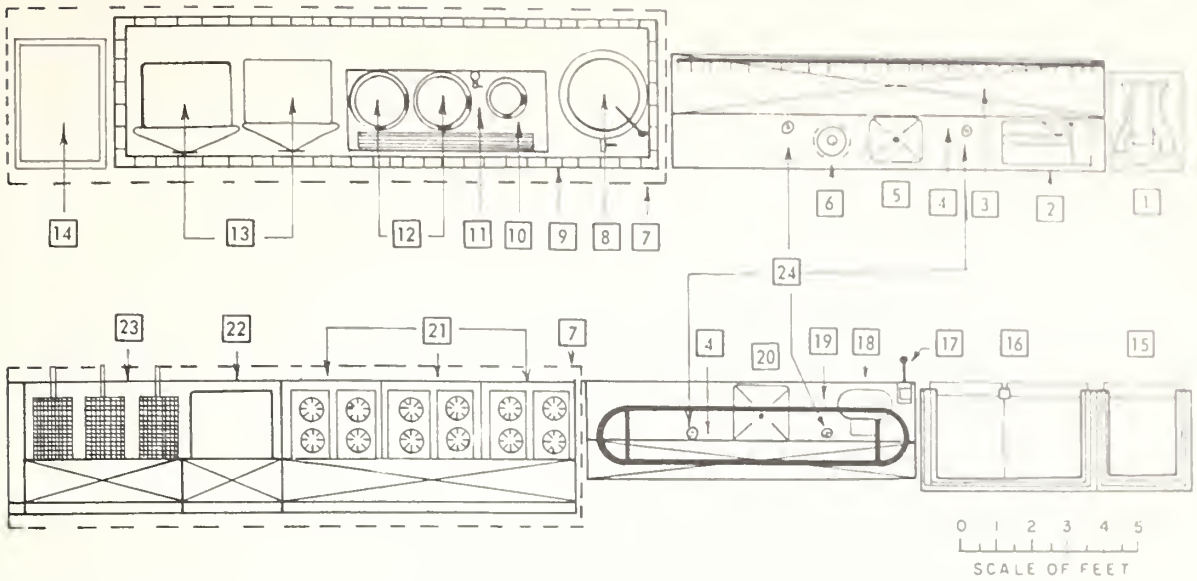
Figure 7 shows a typical meat and vegetable cooking department. The semifinished product or raw material receives its final preparation and is cooked at this location. The concept of straight-line product flow was incorporated in this design. Raw material is brought from either the walk-in coolers or the meat and vegetable area and stored in either the reach-in freezer (item 15) or the reach-in refrigerator (item 16). This department is located directly behind the point on the serving line at which these products are merchandised. Equipment has been provided to produce a variety of menu items in bulk or batch-sized quantities.

Bakery

The bakery department (fig. 8) is designed to facilitate flow of the raw products to the blending, portioning, baking, and storing of the finished goods. Labor-saving equipment, such as a portable pie crust rolling machine (item 3) and a portable dough cutter (item 4) has been provided. A large mixer has been provided for blending batch quantities. A smaller mixer is available for the production of such items as pie toppings and desserts. Tilting, steam-jacketed kettles (item 6) with a flexible filler arm have been provided for producing pie filling and similar products. This production area is located directly behind the serving line point at which the corresponding bakery items are displayed.

Salad Preparation

Representative design of a salad department is shown in figure 9. This department is de-



EQUIPMENT SCHEDULE

1...TWENTY-QUART MIXER
2...FOOD SLICER
3...OVERHEAD UTENSIL RACK
4...OVERSHELF (2)
5...COOK'S WORKTABLE WITH SINGLE-COMPARTMENT SINK
6...GARBAGE DISPOSAL, 3 HP
7...EXHAUST CANOPY (2)
8...FORTY-GALLON KETTLE
9...TILE CURBING
10...TEN-QUART STEAM JACKETED TILTING KETTLE
11...STAINLESS STEEL KETTLE STAND WITH FLEXIBLE OVERHEAD WATER ARM
12...TWENTY-QUART STEAM JACKETED TILTING KETTLES(2)
13...STEAMERS (2)
14...BAIN-MARIE
15...REACH-IN FREEZER
16...REACH-IN REFRIGERATOR
17...CAN OPENER
18...PORTION SCALE
19...OVERHEAD UTENSIL AND POT RACK
20...COOK'S WORK TABLE WITH SINGLE-COMPARTMENT SINK
21...OPEN-TOP RANGE WITH OVERSHELF (3) AND OVERHEAD WATER ARM
22...GRILL WITH OVERSHELF
23...DEEP-FAT FRYER WITH OVERSHELF (3)
24...KNIFE WELL (4)

FIGURE 7.—Meat and vegetable cooking department.

signed so that the product may be moved from the raw to finished state with as little backtracking as possible. A mixer (item 12), an overhead 180° F. water arm (item 14), a food cutter (item 6), and similar items are provided to make this department as self-contained as possible. Finished salad products are stored in the reach-in refrigerator (item 8) and in the refrigerated pass-through illustrated in figure 13, item 28.

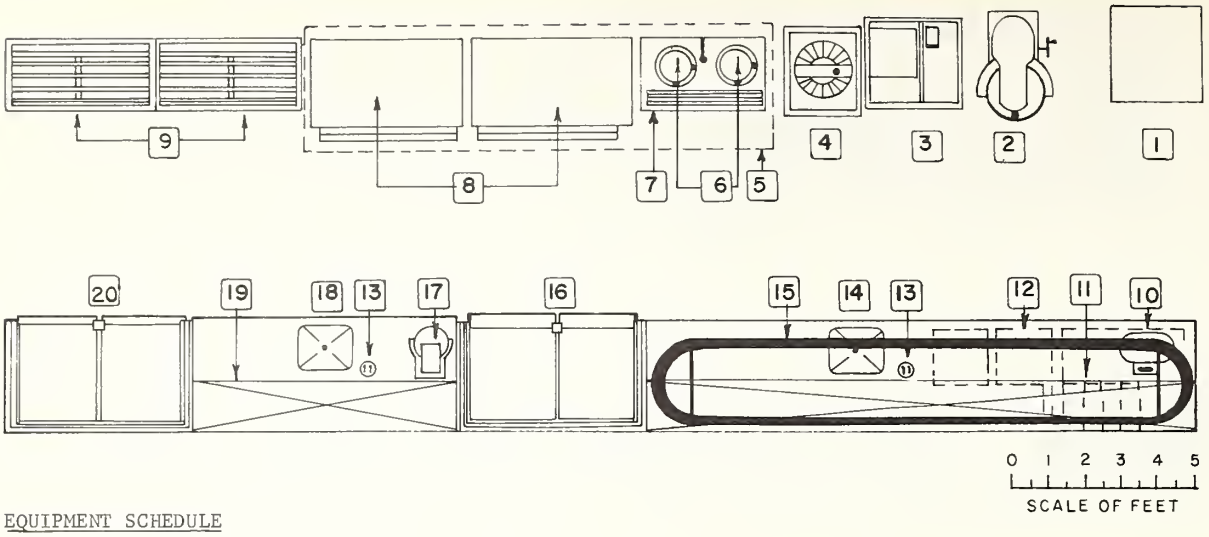
Dishroom

The dishroom plan (fig. 10) is conducive to straight-line product flow. The nylon-belt conveyor (item 1) discharges the soiled tableware onto the roller conveyor (item 2). Successive trays or bus boxes containing soiled tableware are advanced on the roller conveyor until the stop switch (item 3) is activated. This procedure provides a storage space for soiled tableware without stopping the powered belt conveyor (item 1). Tray racks are transported through the machine in a circular path on a powered conveyor. Figure 11 shows this equipment in operation.

Pots and Pans Washing

In the pots and pans washing department (fig. 12), adequate landing space has been provided for clean and dirty pots. A recirculating pump (item 5) agitates the wash water in the first sink, which facilitates the removal of food from pans and utensils.

An overhead spray arm (item 7), with 180° F. water, is used to spray rinse clean pots and pans. This expedites drying. The clean storage racks (item 10) face the production areas to minimize walking distance.



EQUIPMENT SCHEDULE

1...PAN STORAGE CABINET
2...SIXTY-QUART MIXER
3...PIE CRUST ROLLING MACHINE ON PORTABLE STAND
4...DOUGH CUTTER ON PORTABLE STAND
5...EXHAUST CANOPY
6...TWENTY-QUART TILTING STEAM JACKETED KETTLE (2)
7...STAINLESS STEEL KETTLE STAND WITH FLEXIBLE WATER ARM
8...SIX-DECK BAKING OVEN (2)
9...COOLING RACKS (2)
10...PORTION SCALE
11...OVERSHELF WITH SUSPENSION SPICE BINS (8)
12...PORTABLE BINS (4)
13...KNIFE WELL (2)
14...BAKER'S WORKTABLE WITH SINGLE-COMPARTMENT SINK
15...OVERHEAD UTENSIL RACK
16...REACH-IN REFRIGERATOR
17...TEN-QUART MIXER
18...BAKER'S WORKTABLE WITH SINGLE-COMPARTMENT SINK
19...OVERSHELF
20...REACH-IN HOLDING REFRIGERATOR

FIGURE 8.—Bakery.

Serving Line

The serving line is shown in figure 13. The meat and vegetable cooking department, salad preparation department, and bakery are located immediately behind their respective sections on the serving line to reduce travel distance. These serving-line sections are connected to the food production areas with heated and refrigerated past-through units as appropriate.

The design of the serving line contains as much self-service equipment as possible. This reduces the number of employees required on the serving line and sometimes permits an employee to maintain more than one work station.

Storeroom

The storeroom should be properly lighted and ventilated. Bulk food items such as flour and sugar should not be stored directly on the floor, but should be placed on pallets. Shelving should be provided for smaller items. Aisle space should be adequate so that the stock is readily accessible and turnover is ensured. A receiving scale, desk, and filing facilities should be provided.

Walk-in Refrigeration

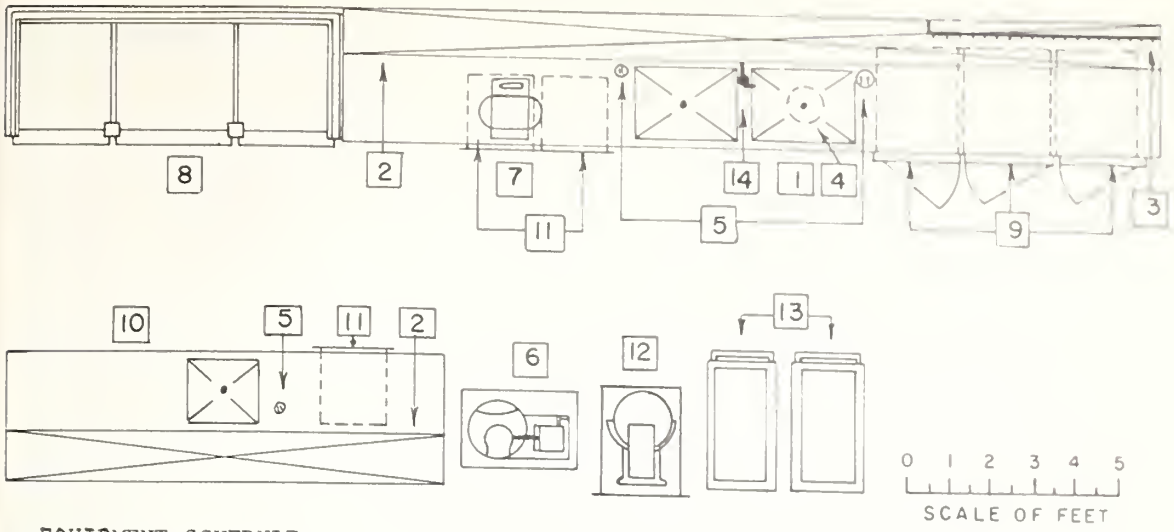
Walk-in refrigerators and freezers should contain the following features:

—Walk-in floors should be flush with the kitchen floor so that portable shelving can be moved into and out of the boxes. This feature facilitates cleaning and moving material on handtrucks into the box.

—Walk-in floors should be pitched and have an exterior drain located adjacent to the door to facilitate cleaning.

—Floors and walls should be fabricated of a nonporous material to expedite cleaning.

—The box should have adequate lighting, activated by an exterior on/off switch. This switch should have an illuminated indicator that would show employees if the lights were on in the box.



EQUIPMENT SCHEDULE

1...SALAD PREPARATION WORKTABLE WITH TWO-COMPARTMENT SINK
2...OVERSHELF (2)
3...UTENSIL RACK
4...2-HP. DISPOSAL UNIT
5...KNIFE WELL (3)
6...FOOD CUTTER ON PORTABLE STAND
7...PORTION SCALE
8...REACH-IN REFRIGERATOR
9...BASE COUNTER REFRIGERATORS (3)
10...SALAD PREPARATION WORKTABLE WITH SINGLE-COMPARTMENT SINK
11...DRAWERS (3)
12...THIRTY-QUART MIXER ON PORTABLE STAND
13...CART (2)
14...FLEXIBLE 180° F. WATER ARM

FIGURE 9.—Salad preparation.

—External temperature gages should be provided. An alarm system should be considered that would be activated when proper storage temperatures are not maintained.

—Safety doors with internal opening devices should be provided.

Equipment and Trash Rooms

Both rooms should be properly ventilated and lighted. The trash room should be equipped with a can crusher, a can-washing unit, and an incinerator.

Equipment Selection

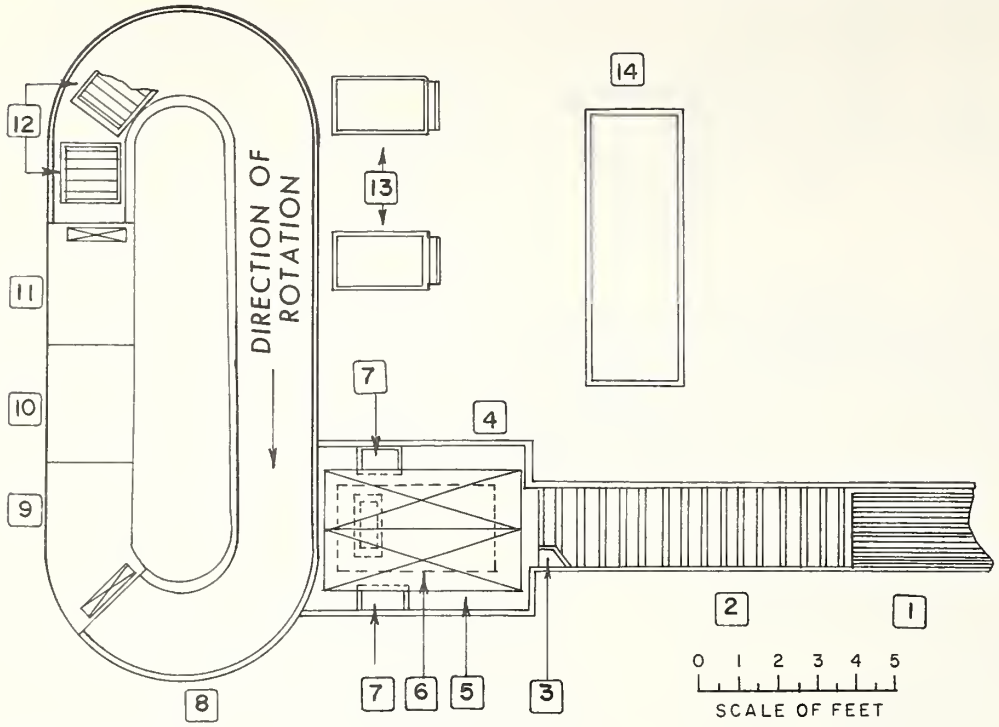
The selection of food preparation equipment should be closely related to the type, number, and variety of menu items that are to be produced and served. Foods that are to be purchased fresh and raw, partially processed, frozen, portioned, or fully processed convenience foods should be determined.

The equipment needed to perform each function and to store, prepare, cook, hold, and serve each menu item should be determined. In choosing equipment, the following should be considered.

—Cost.
—Adaptability to menu requirements.
—Capacity to meet peak and off-peak production load requirements.
—Labor requirements.
—Availability of maintenance service.
—Reliability and simplicity of operation.
—Flexibility to meet changing requirements.

It is necessary to consider the sequence of operations and the various processes that are required to produce and serve each menu item. The equipment for work centers in each department should be geared to the efficient functioning of the department as a whole. The individual departments must then be related to minimize walking distances and cross traffic by achieving good patterns of circulation.

Equipment needs are governed by how the work area is to be operated and controlled; the necessary skilled or unskilled personnel required to operate the equipment; and utility requirements based on availability, cost, and operating characteristics.



EQUIPMENT SCHEDULE

1...SOILED DISH CONVEYOR - POWERED NYLON-BELT TYPE
2...SOILED DISH CONVEYOR - NYLON-ROLLER TYPE
3...STOP SWITCH FOR POWERED CONVEYOR
4...SOILED DISH TABLE
5...INCLINED OVERHEAD GLASS-RACK SHELVES (2)
6...5 HP. DISPOSAL UNIT (HAMMERMILL TYPE)
7...SILVER SOAK BIN (2)
8...DISHMACHINE - CONVEYORIZED DISHRACK TYPE
9...DISHMACHINE PREWASH SECTION
10...DISHMACHINE WASH SECTION
11...DISHMACHINE FINAL RINSE SECTION
12...DISH RACKS
13...CLEAN DISH DOLLIES (2)
14...SILVER SORTING AND WRAPPING TABLE

FIGURE 10.—Dishroom.

Of prime consideration in equipment selection is reliability and maintenance requirements. Questions as to the caliber and availability of equipment service should be satisfactorily answered.

The question of flexibility of equipment is assuming increased importance through changing technology in food preparation and marketing.

Today's trends in cafeteria equipment center around layouts and equipment that reduce travel requirements and expand the use of refrigerated and heated storage and holding equipment. These include:

—Greater use of pass-throughs for hot and cold foods and dishes.

—Increased use of food-warming devices including holding cabinets and infrared lamps.

—Greater use of small batch cooking equipment, such as pressure cookers on the serving line to insure taste and freshness of vegetables.

—More use of reach-in and under counter refrigerators at work stations.

—Increased freezer capacity to provide necessary storage for frozen vegetables, meats, and convenience foods. Increased capacity also permits some leveling of the production load through preparation well ahead of intended use.

—Greater use of mobile equipment.

—Greater use of extended soiled-dish conveyors for convenient use in dining room area.

The use of new convenience foods requires detailed planning if good operating results are to be expected. Technological advances in preparation equipment should be utilized in the reconstitution of ready foods. Compact, preportioned, partially prepared, frozen, or dehydrated instant foods often require specialized equipment for handling and storage.

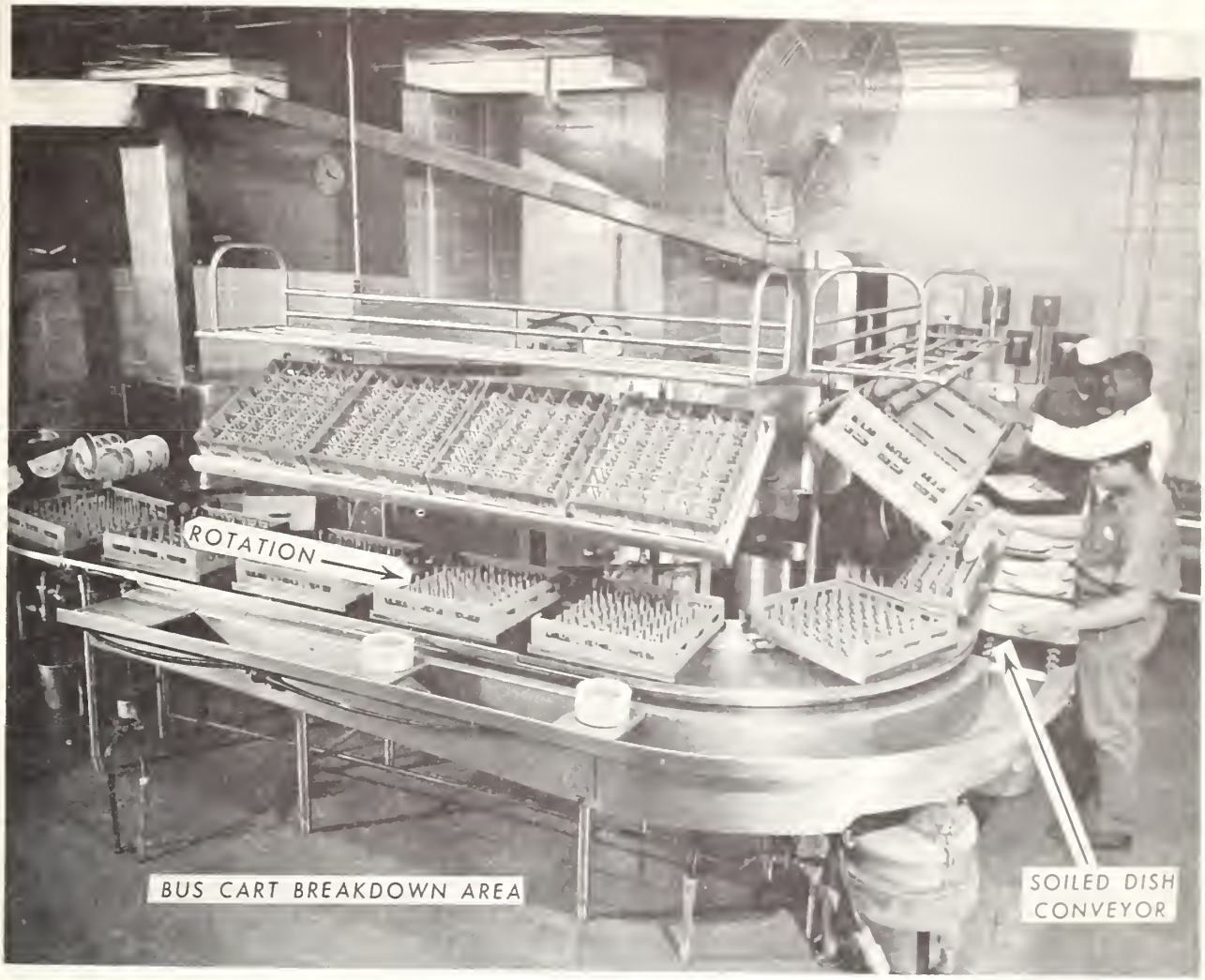


FIGURE 11.—A modern dishroom.

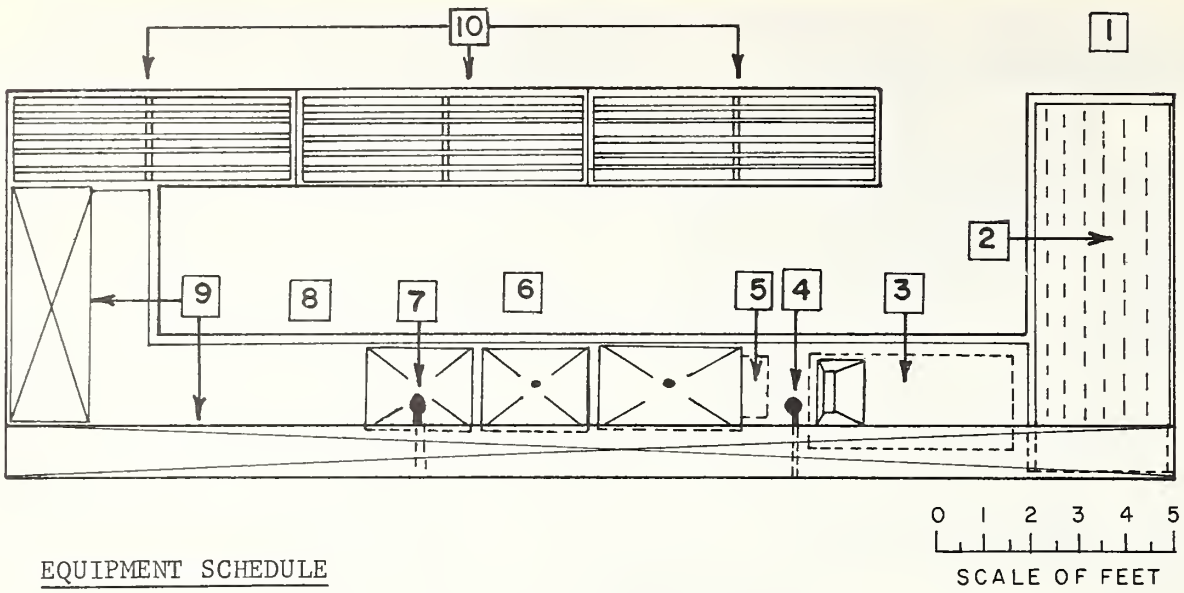
Alternative choices of equipment should be carefully evaluated as to their potential reduction of labor requirements. Small savings in labor time often add up in a year to a substantial part of the cost of the equipment. The trend toward fewer, more highly paid employees and toward self-service should be exploited in the selection of equipment.

SOME EFFICIENT WORK METHODS OBSERVED IN THE STUDY

Throughout this study, the operating methods that were conducive to increased labor productivity and reduced operating costs were recorded. Some of these improved methods evolved from the application of an analytical technique (*4*), while others were developed from experience. A resumé of the better operating methods follows.

Transporting Soiled Tableware

One reason for excessive travel by bussing personnel in most cafeterias observed was that they were not provided with bus carts. Without the use of a bus cart, a bus boy or girl makes approximately one trip to the dishroom for every four customers served. Bus carts would reduce these travel requirements by approximately 80 percent as an employee would



EQUIPMENT SCHEDULE

1...SOILED LANDING TABLE
2...INCLINED SKATE-WHEEL CONVEYOR
3...5 HP-DISPOSAL UNIT (HAMMERMILL TYPE)
4...OVERHEAD SPRAY RINSE ARM SUPPLIED WITH COLD WATER
5...RECIRCULATING PUMP - WASH WATER
6...THREE-COMPARTMENT POT SINKS
7...OVERHEAD SPRAY RINSE SUPPLIED WITH 180° F. WATER
8...CLEAN LANDING TABLE
9...INCLINED OVERSHELVES (2)
10...CLEAN PAN STORAGE RACKS (3)

FIGURE 12.—Pots and pans washing.

make one trip to the dishwashing area for every 20 customers served.

An illustration of the potential savings which were available through the use of carts was developed by comparing the bussing man-hour requirements of cafeterias I and L. Both cafeterias had approximately 6,000 square feet of dining area with a seating density of 7.5 seats per 100 square feet. In cafeteria L, bus carts were seldom used. In cafeteria I, each employee had a cart, and the carts were used about 50 percent of the time. Cafeteria I realized gross savings of $2,530[3] per year by using bus carts 50 percent of the time. Table 10 shows the man-hour requirements for bussing personnel in both cafeterias.

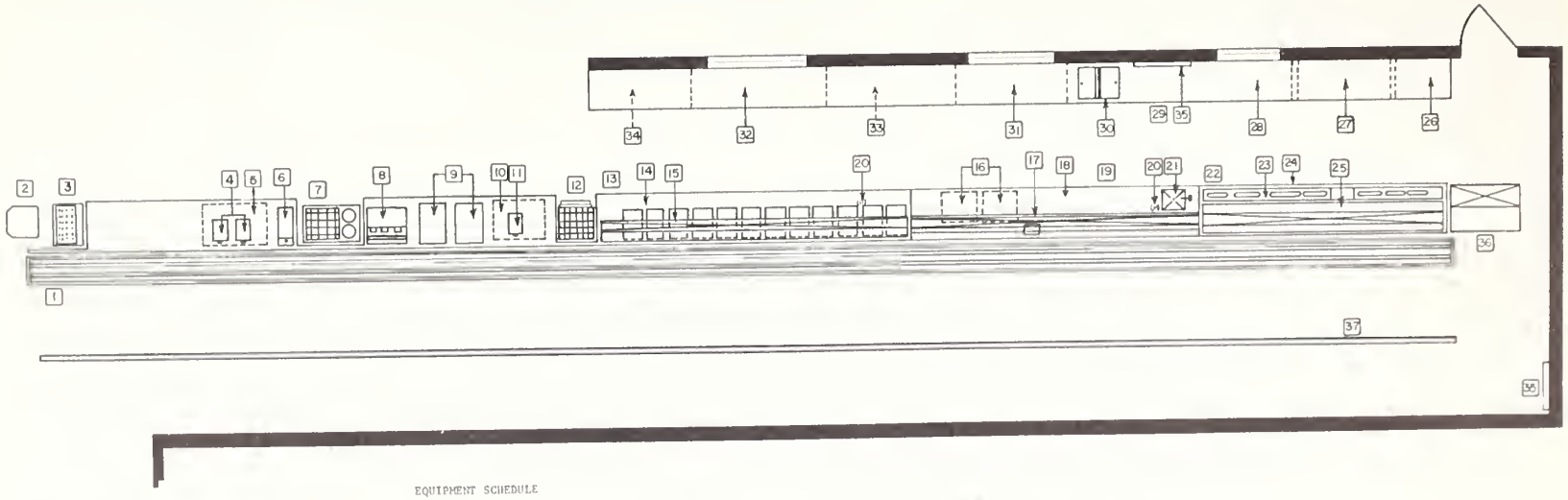
[3] Average hourly wage rate = $1.25
Daily hourly savings in travel time 22.18 minus 16.63 = 5.55 man-hours
Annual savings = (5.55 man-hours × 365 days × $1.25).

TABLE 10.—*Man-hours per day spent in bussing, cafeterias I and L*[1]

Item	Cafeteria I	Cafeteria L
Activity:[2]	*Man-hours*	*Man-hours*
Travel (18)	16.63	22.18
Serve customers (19)	2.57	7.12
Setup tables (21)	2.18	.40
Clear tables	15.05	20.00
Miscellaneous work (22)	5.15	4.95
Personal and rest allowance (4)	4.16	5.54
Total	45.74	60.19
	Number	*Number*
Employees bussing per day	5.7	7.5
Customers served per employee	347	264

[1] Man-hour requirements are for 1,980 customers in a 6,000 square foot dining area containing 450 seats.

[2] Numbers in parentheses refer to activity described in appendix.



0 1 2 3 4 5
SCALE OF FEET

EQUIPMENT SCHEDULE

1...TRAY RAIL
2...CHECKER'S CHAIR
3...ITEMIZED CHECKING MACHINE
4...SELF-SERVICE COFFEE AND HOT TEA DISPENSING HEADS
5...UNDERCOUNTER COFFEE URNS
6...SELF-SERVICE CREAM DISPENSER
7...CANTILEVER-TYPE CUP AND SAUCER DISPENSER (PORTABLE)
8...SELF-SERVICE THREE HEAD COLD DRINK DISPENSER
9...SELF-SERVICE PORTION-CONTROLLED ICE MACHINES (2)
10...UNDERCOUNTER MILK COOLING MACHINE
11...MILK DISPENSING HEAD
12...CANTILEVER GLASS-RACK LOWERATOR (PORTABLE)
13...TWELVE WELL-SERVING LINE
14...UNDERCOUNTER PLATE STORAGE
15...SNEEZE GUARD
16...HEATED UNDERCOUNTER ROLL STORAGE UNITS (2)
17...BUTTER PAT DISPENSER
18...UNDERCOUNTER PLATE STORAGE
19...BREAD AND PASTRY STATION
20...KNIFE WELL (2)
21...SINK
22...SALAD STATION
23...SALAD DRESSING WELL
24...REFRIGERATED UNDERCOUNTER STORAGE
25...INCLINED REFRIGERATED COLD PLATE
26...UNDERCOUNTER SILVER STORAGE
27...UNDERCOUNTER SALAD PLATE STORAGE
28...UNDERCOUNTER REFRIGERATED SALAD PASS-THROUGH
29...BACK COUNTER
30...ICE CREAM CABINET
31...BAKERY PASS-THRO[illegible]
32...MEAT AND VEGETABLE HEATED PA[illegible] STORAGE
33...SPACE AVAILABLE FOR BE[illegible] GRILL
34...SPACE AVAILABLE FOR BE[illegible] OF FROZEN VEGETABLE
35...MENU BOARD (2)
36...TRAY [illegible] WITH OVERSHELF FOR [illegible] OR [illegible]
37...RAIL

FIGURE 13.—Serving line.

FIGURE 14.—Rotary salad assembly table.

FIGURE 15.—Rotary bakery assembly table.

Rotary Assembly Table

A labor-saving device observed during this study was the use of a rotary or "lazy-susan" table in the salad and bakery departments. Figure 14 shows a salad girl preparing tossed salads, and figure 15 shows a bakery girl filling pie shells using this type of table.

With a hand movement, the girl revolves the table, moving the plates directly in front of her, and thus reducing the walk and reach requirement of this task. The various ingredients were taken from an adjacent table or cart and assembled into the final product on the rotary table.

A lazy-susan salad table tested in a midwestern cafeteria showed these advantages:

—Increased productivity from 43 to 217 percent depending on the type and number of salads assembled at one time.

—Fresher salads (because they are made closer to the time of sale).

—Less operator fatigue.

—Ingredients more easily accessible.

The chief disadvantages were that the table:

—Is specialized equipment.

—Has no storage space for raw ingredients.

—Needs more floor space than conventional tables.

Soiled Pots and Pans Conveyor

Another labor-saving device observed was a conveyor that transported soiled pots from the meat and vegetable cooking area to the pots and pans washing area. An inclined skate-wheeled conveyor was connected to the back of the pots and pans sink. The meat and vegetable cook placed soiled pots and pans upon the conveyor and they rolled to the opposite end where they were washed. Figure 16 shows this conveyor in use.

Mobile Cooler Racks

Some of the operators have equipped the walk-in coolers and freezers with mobile racks. With mobile racks, employees can conveniently roll food products directly from the box during the cleaning operation. This type of shelf storage was superior to the stationary type in that each item of food did not require handling to clean the walk-in box.

Filling Water Glasses

A unique labor-saving feature was used to fill glasses with ice and water in one of the cafeterias (fig. 17). A plastic jig, which fitted over the base of the glasses, was positioned over the glasses while they were in the dish-machine rack. The rack was then turned over and removed leaving the glasses free standing, mouth up. A stainless steel bin approximately 3 inches deep, with 20 circular openings matching the mouths of the glasses, was then placed on top of the glasses (*A*). Ice was scooped into the bin and distributed into the water glasses (*B*). The bin was removed and the 20 glasses were filled by dispensing water from a flexible overhead arm (*C*).

Beverage Dispensers

One way to reduce labor costs on the serving line is to design as many self-service features as possible into the line. Two types of self-service milk dispensers were observed in the cafeterias studied. In one cafeteria, milk was sold in cartons. An inclined shelf was mounted over a refrigerated base cabinet. Milk cartons were merchandised on this inclined, gravity-fed shelf. As the customer selected a carton of milk, the carton directly behind slid to the front of the shelf; thus the beverage station girl was not required to move the milk cartons forward after each customer selection. In another cafeteria, milk was sold by the glass. The customer obtained a standard 8-ounce glass from a glass rack and positioned it beneath the pouring spout. The glass was filled by depressing a button which activated an automatic dispenser.

A labor-saving method of dispensing carbonated beverages on the serving line was also observed. A three-head, carbonated beverage dispenser was located on the line. The dispensing heads were adjacent to the rail making it a self-service unit; thus the beverage girl did not have to serve the customer.

Wrapped Silver Storage

One operator reduced the travel or walking requirements of employees handling wrapped silver at the serving line by installing a roller conveyor. An inclined roller conveyor stacked with the standard cafeteria trays of wrapped silver extended from the serving line rail, through the partition behind the line, into the kitchen. As the silver supply on one tray was exhausted, the tray was removed and placed on a tray stand. This allowed the next tray with wrapped silver to roll down the conveyor for customer use.

FIGURE 16.—Soiled pots and pan conveyor.

FIGURE 17.—Filling water glasses: *A*, Positioning ice bin over water glasses; *B*, placing ice in glasses using bin; *C*, filling glasses with water.

Order-Call System

Some of the cafeterias studied offered cooked-to-order items, such as grilled steaks. One operator offering grilled steaks increased line speed by installing an order-call system. The various steak cuts were merchandised on ice in a portable food cart. The cart and a telephone of an intercommunication system were located at the entrance of the serving line. The second telephone was located at the grill station behind the hot food section of the serving line. The customer telephones his order into the grill man from the entrance of the serving line. The grill man in turn supplied the customer with an order number. When the customer arrived at the grill station on the serving line, he picked up the steak with his identification number. If the steak was not cooked upon the patron's arrival at the grill station, the customer picked up the identification number and proceeded through the serving line to a table. The grill cook signaled dining room employees for delivery of the steak.

PERSONNEL SELECTION, TRAINING, AND MOTIVATION

Increasing wage pressure, combined with a shortage of trained workers, has made it increasingly necessary for food service operators to develop effective programs and procedures for selecting, training, and motivating employees.

Cost of Employee Turnover

The more recognizable elements of labor costs are the payroll and related expenses, such as employee meals, taxes, and fringe benefits. There are, however, other "out-of-pocket" costs that are not as apparent, such as those

incurred in hiring and training new employees. Advertising, interviewing, training, medical examination, and welfare are typical expenses in this area. Every time an employee is replaced by another, these or similar expenses are incurred. The U.S. Department of Labor estimated the costs of turnover per separated worker at about $232.18 (5). In an effort to offset this expense, many experienced operators have established effective procedures to select, train, motivate, and schedule employees.

Employee Selection

In one cafeteria in this study, prospective employees are given an aptitude test. This employer has found, after extensive experience, that people with a median intelligence quotient are the most desirable employees. Persons with a high IQ tend to become bored with repetitive tasks, and those with low IQ's require excessive training and supervision.

During the job interview, an applicant is told the hourly wage rate, working days and off days, fringe benefits, and disciplinary policy. He is given a general description of the job, including typical tasks, and taken on a tour of the facility. The employer gets a commitment from the applicant concerning job interest.

Employee Training

One innovation in training is the use of text materials that give the employee information and training for his job. The employee is usually tested on this material.

Some operators use job descriptions as a guide in training. The operator reviews the job description with the employee to insure that he understands all phases of the job. The job description lists such pertinent information as experience and educational qualifications; comprehensive list of the work to be performed by the employee in that job category; the working conditions under which the employee will be required to produce; the relation of the job to others; how the job or elements of work might be combined with other job categories; and the qualifications for promotion to the next highest job category.

A formal training program is a useful device for training employees to handle more than on job category. Increased employee competence permits job combination, greater flexibility, and more effective control of employee scheduling.

Table 11 shows the percentage of utilization of direct labor (preparation, utility, and serving personnel) and the payroll ratio to sales in the 12 cafeterias, and those in which multiple job assignments were effected. In each of the units having a formal training program, their employees were assigned to work in more than one department as needed, whereas in those employees worked in only one department. Cafeteria A was the only cafeteria in the group having no training program that assigned multiple jobs. The cafeterias using a formal training program had an average payroll ratio to sales of 3 percent less, and 8.2 percent labor utilization, than the cafeterias without training programs. The use of formal training programs in the cafeterias studied indicated an annual saving of $49,700. (Average annual payroll of $244,000 for cafeterias without training programs compared with average annual payroll of $194,300 for cafeterias with training programs.)

TABLE 11.—*Impact of cafeteria training programs, 12 cafeterias*

Cafeterias with and without training program	Multiple job assignments	Direct labor utilization	Payroll ratio to sales	Annual payroll cost
Formal program:		*Percent*	*Percent*	*Dollars*
B	Yes	85.7	34	81,600
C	Yes	78.9	30	172,500
E	Yes	85.7	27	175,500
H	Yes	70.9	30	235,500
L	Yes	83.3	30	306,600
Average		80.9	30	194,300
No program:				
A	Yes	85.4	30	86,700
D	No	76.7	29	151,200
F	No	76.3	28	249,500
G	No	59.8	38	154,300
I	No	75.3	30	240,000
J	No	63.5	44	374,000
K	No	71.9	33	452,000
Average		72.7	33	244,000

Motivation

It is often assumed that employees are only motivated by financial reward. However, once financial compensation has been obtained, other elements enter into the motivation of an employee and affect productivity. Such fringe benefits as hospitalization insurance, a retirement program, paid vacations, and sick leave are also important. Most of the cafeterias studied have two or more of these fringe benefits available to their employees.

The opportunity for advancement within the organization is important to some employees. Many operators have achieved satisfactory results by following a policy of promotion from within the organization. Job satisfaction, an intangible but very important factor, is enhanced by letting the employee know that his efforts are important and appreciated.

LITERATURE CITED

(1) Anonymous.
1964. Submarine galley improvement based upon industrial engineering studies and techniques. U.S. Naval Supply Res. Devlpt. Facility Tech. Rpt., 22 pp., illus.

(2) Biederman, K., Wilhemy, O., Jr., Dull, J. R., and Bouma, J. C.
1966. Layout, equipment, and work methods for school lunch kitchens and serving lines. U.S. Dept. Agr., Market. Res. Rpt. 753, 45 pp., illus.

(3) Dana, A. W.
1949. Kitchen planning for quality food service. Harper and Bros., New York, N.Y.

(4) Kotschevar, L. H., and Terrell, M. E.
1961. Food service planning: layout and equipment. 449 pp., illus. John Wiley and Sons, N.Y.

(5) U.S. Department of Labor, Bureau of Employment Security.
1962. Suggestions for control of turnover and absenteeism. U.S. Dept. Labor, Bur. Employment Security BES-E-61.

(6) Volume Feeding Management.
1967. Plan and design systems. Feb. ed., illus. Conover-Mast Pub., N.Y.

(7) Welch, John
1966. A task concept for on-the-job training in food service. Univ. Mo. Ext. Serv. Manual 66, 118 pp., illus.

APPENDIX

Exhibit A.—Method of Determining Labor Requirements

The method used in developing man-hour requirements was work sampling. The work sampling procedure is, in brief, the taking of qualitative observations of a work system randomly over a period of time. The use of work sampling rather than time study is based on the law of probability which holds that a random sample tends to have the same characteristics as the whole.

The specific steps employed in the development of man-hour requirements were as follows: Classifying the major areas of work such as bakery and salad preparation; classifying the types of work within areas such as cooking meat or baking; determining the number of observations required to provide a 10 percent tolerance; selecting the observation route and observation points; determining the random observation times; observing employees for each activity by the various classifications of work; recording the performance of the employees by pace rating; recapitulating the observed data; determining personal and rest allowances; determining and summarizing the actual man-hours worked and the number of customers served during the work-sampling study; and calculating the man-hour requirements based on the data obtained in the preceding steps.

Certainly there is a difference in approach between the production-line operator manning an automatic machine and that of a meat-preparation cook who must spend time in observing the condition of food products while cooking. Credit for productive work was given when certain employees were "at attention to the preparation process." Credit for productive work was also given when an employee on the serving line was "at attention to the serving process." Time spent in "travel" was also credited as productive work due to the extensive employee travel requirements imposed by the typical cafeteria layout.

In short, those activities peculiar to cafeteria operations that could be fairly categorized as in the required attention and observation activities were classified as productive-work activity.

Exhibit B.—Characteristics of the Cafeterias Studied

The man-hour requirements that were developed for each of the 12 participating cafeterias were summarized into two groups—those with one serving line and those with two serving lines. The double-line cafeterias were usually larger than the single-line cafeterias. A general description of the facilities in each group of cafeterias is given. The food was well merchandised on the serving lines, of excellent quality, and served by attractively attired personnel in each of the 12 cafeterias studied.

Single-Line Cafeterias

This group of cafeterias has a single serving line. The basic operating statistics for the six

cafeterias in this group are shown in table 1.

Cafeteria A.—Cafeteria A is a single-unit operation and managed by a partnership structure. The dining area, with a seating capacity of 266, consists of two rooms. The rear dining area can be closed off with a fold-a-door partition for parties and business meetings.

The serving line is a straight line. The checker, positioned at the end of the serving line, processes each customer's check and payment is made to the cashier who is located at the dining room exit.

The kitchen is directly behind the serving line. Straight-line flow is accomplished in the salad department. An attempt was made to accomplish straight-line flow in the bakery and meat and vegetable cooking areas; unfortunately, the depth of the kitchen is such that this was not possible. Employee restrooms and locker facilities are located in the rear of the cafeteria.

The management handles employee recruitment and training. Orientation concerning the job is conducted by the manager or his designee. Employees are trained to perform more than one job, enabling the management to transfer employees from one production department to another. The new employee is usually put under the supervision of an experienced employee. When he becomes efficient in the initial job assignment, he is trained for a more responsible position in the operation.

Cafeteria B.—Cafeteria B is a single-unit operation, situated on the second floor of a building, and managed by the owner. A variety of retail business enterprises are located in the area. Patrons consist primarily of shoppers, Government employees, and businessmen.

The present owner acquired the business more than 15 years ago. The kitchen and dining area were remodeled approximately 10 years ago. Prior to remodeling, time and travel studies were made of each of the kitchen employees to determine where each traveled, and the importance of travel in relation to the total job to be performed. Excessive travel distances in relation to the frequency of trips were pointed out in a report that was utilized in the design of the present kitchen layout.

Directly beneath the cafeteria, on the first floor, is a pantry house. This pantry house has a miniature serving line; such items as baked goods, sandwiches, one hot food item, soup, and coffee are served. Cold drinks are dispensed from a coin-operated vending machine. Food is transferred to the serving area from the bakery and kitchen by a dumbwaiter that is located to the rear of the seating area.

During this study, high standards of cleanliness were observed on the serving line, which was designed in an L-shape. The checker, positioned at the end of the serving line, totaled items and gave each customer a check. These checks were paid to the cashier, located at the dining room exit.

The kitchen utilizes straight-line flow principles in the meat and vegetable cooking and salad preparation areas. A partition directly behind the serving line where meat, vegetables, and salads are merchandised separates the corresponding production facilities. Raw material is transported to the kitchen area by an elevator. The boiler room, trash storage, and an additional storeroom are located in the basement.

Employee recruitment and training are handled primarily by the owner. A training manual is used to describe the basic tasks for each job. This manual also indicates the time of day each of these tasks is to be performed. The new employee is then assigned to the job, usually under the direct supervision of an experienced employee.

When the employee becomes efficient in the initial job assignment, he is trained for a more responsible position. This practice enables management to switch employees from one department to another as needed. Employee fringe benefits include hospitalization insurance and a profit-sharing plan. As a result of these practices, minimum difficulty is experienced in recruiting, training, and retaining a more desirable type of employee. Of the 32 employees with the company, 26 of them have been with the company for 9 years or more.

Cafeteria C.—Cafeteria C is a multiunit operation managed by a partnership. The serving line is U-shaped. The checker and cashier are located at the end of the serving line.

The kitchen is well-ventilated and well-illuminated and is on the same floor as the serving line and dining room. Employee locker rooms and restrooms are adjacent to the kitchen.

Employee recruitment and training is handled by management. Training manuals covering every position in the operation are utilized.

Cafeteria D.—Cafeteria D, a multiunit operation, is managed by a corporate structure. The cashier's booth is located at the dining room exit. The food checker records and adds each patron's food selection with one of the newly developed combination checking machines. By depressing a single key on the machine, the checker tallies each food item as well as totaling the price. Each key of the checking machine identifies a specific product on the serving line.

The kitchen is spacious, well-illuminated, and air conditioned, and provides employees with a desirable working environment. There are two employee lounges, one for kitchen per-

sonnel and the other for serving-line personnel. Both lounges contain a television set, lockers, restrooms, and appropriate furniture.

Employee recruitment and training is handled by the unit management. Training consists of initial orientation concerning the particular job by the manager, and assignment to the job under the supervision of an experienced employee. Headquarters management at the time of the study was preparing a training manual for use throughout the chain.

Cafeteria E.—Cafeteria E is a multiunit operation managed by a corporate structure. Dining room lighting fixtures are controlled by rheostat to balance artificial illumination with outside lighting conditions. The dining room has two areas that can be closed off with folding doors for parties or banquets. A unique type of deuce table (a table for two) is utilized in this cafeteria in which two deuce tables are connected with a recessed shelf for condiments. This arrangement reduces the investment and maintenance of condiment containers by half, and is conducive to customers sharing tables.

The serving line is designed in a straight line, and so positioned that customers pass by the complete counter display before making their selections. This arrangement affords the patron the opportunity to preview the food offerings and decide what to order before arriving at the serving line. The checker and cashier are located at the end of the serving line.

The kitchen utilizes straight-line flow principles. A partition directly behind the steam table separates the section where the meat and vegetables are merchandised from the area where they are prepared. The same principle is followed for the bakery and salad areas. The kitchen is well-illuminated and work stations are well designed. Tool and spice racks are located so that travel requirements and lost motion are minimal. Employees have a private dining room and locker rooms.

Employee recruitment and training are handled in a unique manner. The initial employment interview is conducted by the cafeteria's manager. If the applicant is suitable, the manager sends him to the personnel director who further screens the prospective employee through a series of tests. Upon successful completion of the tests, the applicant is shown a film about the various aspects of the particular job for which he is applying. The new employee is then sent back to the manager who reviews the various duties of the position. Training manuals encompassing every position in the cafeteria are used in this orientation. The new employee is then assigned to the job, usually with an experienced employee. As a result of this practice, minimum difficulty is experienced in recruiting, training, and retaining desirable employees.

When the employee becomes efficient in the initial job assignment, he is trained for a more responsible position. This practice enables management to switch employees from one department to another as production requirements dictate. As a result of this flexibility in scheduling and superior kitchen design, this cafeteria had a most outstanding labor utilization.

Cafeteria F.—Cafeteria F is a single-unit operation managed by the owner. A soiled-dish conveyor extends into the dining area, thereby reducing travel requirements and traffic congestion in the dishroom.

The variety and quality of food, in addition to excellent floor service, is such that patrons are drawn to this cafeteria from a 20-mile radius. Most of the customers are retired. Many of the items offered on the menu are not generally found in a cafeteria. Such items as papaya, bean sprout and artichoke heart salads, prime ribs of beef, New York steaks, and lamb chops are offered daily.

The kitchen is well-illuminated, and high standards of sanitation are observed. The production of pies and cakes by the bakery is at least one day ahead of consumption and held in a freezer. This practice virtually eliminates a shortage of baked items on the serving line, and creates a stable workload in the bakery. The bakery, employee restrooms, and office are located on the second floor. Raw material and finished products are transported to and from the bakery on a dumbwaiter.

Employee recruitment is handled by the owner. The employee is hired with the understanding that the first 2 weeks are probationary. During this period, a supervisor devotes most of his time to training the new employee. Upon completion of the 2-week training program, progress is reviewed and a decision reached on whether the employee should be retained on a permanent basis. The average hourly rate per employee is $1.56, and the average yearly bonus paid to each employee is $630. The bonus is based on longevity with the company and the degree of responsibility.

Back-of-the-house and kitchen employees are trained to perform more than one job. As a result of the initial screening and training, above-average remuneration, and a highly favorable working environment, little difficulty was experienced in retaining desirable employees. The average length of service for back-of-the house personnel, excluding the dishroom, was 8 years.

Double-Line Cafeterias

Cafeterias in this group have double-serving lines. The basic operating statistics for the six cafeterias in this group are shown in table 2.

Cafeteria G.—Cafeteria G is a multiunit operation managed by a sole owner. The cafeteria's facilities are located on four floors of a building, with the bakery, vegetable and meat preparation, and dishwashing areas located in the basement. The main dining room, serving line, and meat and vegetable cooking areas are located on the ground floor. Public restrooms, offices, employee restrooms, and lockers are on the second floor. Additional employee restrooms and lockers as well as equipment are on the third floor.

The main dining room seats 216 patrons; the mezzanine, an additional 186 customers.

Serving line No. 1 is designed in a U-shape and No. 2 in an L-shape. Serving line No. 2 is situated between the two "legs" of line No. 1. The method of displaying food on these two serving lines is unusual. This cafeteria is one of the forerunners in developing the "scramble" configuration of serving-line layout. The U-shaped line (serving line No. 1) is, in effect, one and a half serving lines. Two salad counters, two hot food counters, a pastry station, and a beverage station are located on this line. A support column, located adjacent to the tray rail on line No. 1 and opposite the midpoint of the two hot food counters, forces the customer to remove his tray from the rail at this point. He then proceeds either down line No. 1 to obtain the rest of his food order, or moves to line No. 2 to obtain his pastry and beverage order. This travel path is shown in figure 18 and is indicated by the solid line.

Another option afforded the patron would be to obtain salad from line No. 1, move to line No. 2 for pastry, move back to line No. 1 for the entree (from the second hot food section), and skip to line No. 2 for the beverage. This travel pattern is shown by the dashed line in figure 18. These are but two examples of the customer-flow patterns observed in this cafeteria.

A checker is positioned at the end of each serving line. Check payment is made to the cashier located at the dining room exit.

Straight-line production flow is accomplished in the salad preparation and dishroom departments. The meat and vegetable cooking and salad preparation departments are located directly behind serving line No. 1.

Employee recruitment is handled centrally. The new employee is assigned to a cafeteria where he subsequently receives an orientation concerning the particular job from the unit manager or his assistant. A new employee is usually assigned to the job with an experienced employee. When he becomes efficient in the initial job assignment, he is trained for a more responsible position and promoted when a vacancy occurred.

Cafeteria H.—Cafeteria H is a multiunit operation and managed by a corporate structure. The dining area is divided into four rooms. Dining room lighting is controlled by rheostats to balance with outside lighting conditions.

The kitchen utilizes straight-line flow principles in the meat and vegetable cooking and dishroom departments. A partition directly behind the steam table separates the section where the meat and vegetables are merchandised from the area where they are prepared. The pot washing area is located directly behind the meat and vegetable preparation area. One feature observed in the meat and vegetable cooking area was the method of supplying the cook with the raw product. The meat and vegetables were brought directly from the preparation area and stored in reach-in refrigerators in the cooking area. The cook would then go directly to the reach-in refrigerator, located in this area, to obtain products to cook. When cooked, the product went directly into a heated pass-through unit directly behind the serving line.

The serving line is designed in a shallow U-shape. A checker, positioned at the end of the serving line, tallies each customer's check. Payment is made to the cashier located at the dining room exit.

In this cafeteria, employee recruitment and training are handled by the unit's management. Job descriptions and training manuals outlining the responsibilities of each position are used. A new employee is usually assigned to a job with an experienced employee. When he becomes efficient in the initial job assignment, he is trained for a more responsible position. Employees participate in a profit-sharing plan, and compensation is based on longevity, skill, and responsibility.

This chain has a formal management training program. It is approximately 12 months for assistant managers. During this period, the prospective assistant works at each job in the cafeteria. Upon completion of each job assignment, he is given a standard test. The training period for food production managers is approximately 6 months. The primary difference in training for assistant managers and for food production managers is that the assistant manager trainee works in "back-of-the-house" jobs as well as "front-of-the-house" jobs, whereas the food production manager only works in "back-of-the-house" job categories.

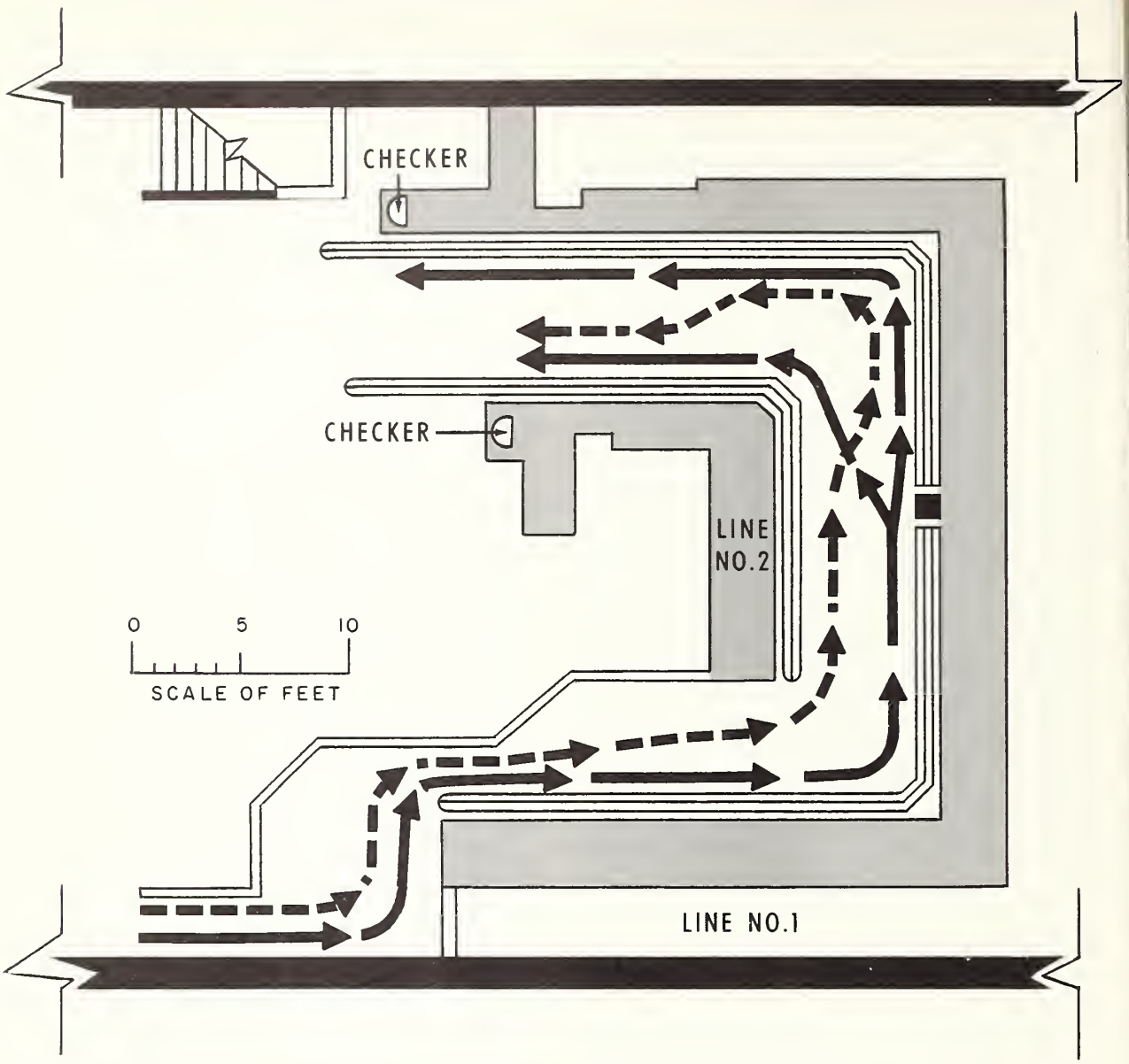


FIGURE 18.—Double-line cafeteria serving line customer flow.

Cafeteria I.—Cafeteria I is a multiunit operation managed by a corporate organization. There are three separate dining areas in this cafeteria. The third room can be closed off with folding doors when it is reserved for parties or banquets. The seating arrangement in all three rooms is spacious with adequate aisle space. Bus carts are used to clear tables, reducing travel requirements.

The straight serving lines meet at a right angle. Before starting down either line, the patron obtains a tray at the junction of the two. The customer must walk by the counter display on line No. 1 on his way to the tray station. Thus he has the opportunity to preview the food selection and decide on what to order before he picks up his tray. A checker is located at the end of each line. Checks are paid to the cashier at the dining room exit.

The kitchen is square and well-ventilated and well-illuminated. It is located directly behind the two serving lines. This arrangement is efficient because the two lines are supplied without crossing the customer-flow pattern.

Straight-line flow is accomplished in the salad preparation department. An unusual operating practice observed in this cafeteria was the method of preparing certain meat items. Such items as veal cutlets, salisbury steaks, chopped steaks, and breaded fish were prepared in advance (based on 2 to 3 days' sales projection) and held in the freezer. These meat products were then taken from the freezer and cooked as sales demand warranted.

Employee recruitment is handled by the unit's management. Training consists of the manager, or other designated person, orientating the new employee concerning the particular job and then assigning him the job with an experienced employee.

Under the management training program of this chain, the manager trainee is required to work in each of the jobs in the cafeteria. When the trainee becomes proficient in one job, he is then assigned to another until he has worked in all positions. As a result of multiple job training, a high degree of scheduling and production flexibility is obtained.

Cafeteria J.—Cafeteria J is a multiunit operation managed by a corporate organization. The building in which cafeteria J is located contains a variety of businesses, offices, and retail enterprises. Serving line No. 1 of the cafeteria is located on the first floor. The cashier is located at the dining room exit. Serving line No. 2 is located in the basement and the cashier at the end of the serving line.

The kitchen is well-illuminated and located on the first floor. Food and tableware are transported to line No. 2 by a hydraulic lift. Grilled items and some salads are prepared in a small service kitchen located directly behind line No. 2 in the basement. The manager's office and employee facilities are located on the first floor.

Employee recruitment is handled by management. Training consists of initial orientation concerning the particular job by the manager, and assignment with an experienced employee.

Cafeteria K.—Cafeteria K, a multiunit operation, is managed by a corporate structure. The dining area is divided into four rooms. The main dining room is separated from the customer lounge and cashier's booth by a 72-foot seating unit. A brick partition separates the two serving lines from the dining room.

The kitchen, employee facilities, general offices, and customer restrooms are located in the basement. Two vertical conveyors carry soiled dishes to the dishroom and three elevators transport such items as clean china and hot food to the serving lines.

Employee recruitment and training is handled by management. Training consists of initial orientation concerning the particular job by the manager, and assignment to the job with an experienced employee.

Cafeteria L.—Cafeteria L is one of a multiunit operation managed by a corporate structure. It is situated in a shopping center located in a median-income residential area of the city. This center has 50 stores located in a central mall.

The dining area consists of two dining rooms. From 11 a.m. to 4 p.m., the cafeteria provides background music and from 4 p.m. to 8 p.m., live entertainment. Because of the pleasant dining atmosphere and moderately priced meals, the cafeteria has many reservations for children's birthday parties and for various church and civic organizations' affairs.

The kitchen is well-illuminated and straight-line flow principles are used in the meat preparation and cooking areas. Employees have their own dining room, lockers, and restrooms. The kitchen is located on the same floor as two serving lines and dining rooms.

Employee recruitment and training is handled by the unit's management. Job descriptions outlining the responsibilities of each position are used in the training program. Employee progress is formally evaluated at the end of every 3-month period. Films are currently being used in the safety program.

The training program for management of this chain is excellent. The program of 4 months' duration consists of a minimum of 1 day's training in each position or job in the company. Training usually starts in the dishroom, progresses through the cafeteria into the central-purchasing function, accounting, and executive management. Weekly reports summarizing progress and suggestions for improving operations are submitted during the training period. Each trainee is given a test on all aspects of the business upon completion of the program.

Exhibit C.—Description of Department Function

Meat and vegetable department	Preparing and cooking meat, fish, poultry and vegetables. Employees are butchers and kitchen helpers, fry cooks, broiler men, and similar classification of cooks and cooks' helpers.
Bakery department	Preparing and baking pies, cakes, pastries, cookies, rolls, muffins, and similar products. Employees are bakers, bakers' helpers, and pastry girls.
Salad department	Preparing salads, juices, and appetizers. These employees are salad and pantry girls who may also prepare meat and fish salad sandwiches.
Warewashing department	Washing tableware and trays, wrapping silverware, and transporting clean dishes, glasses, trays, and silverware to the serving line. Cleaning pots, pans, serving utensils, and serving line pans. The workers may also assist in general housekeeping.
Serving and utility department	Serving customers and setting up and removing food products from the serving line. Transporting food and serving utensils to the serving line. The workers may also assist in the cleaning of the serving line and general housekeeping.
Bus and tray department	Removing soiled dishes, silverware, glasses, and trays from the tables and transporting same to the dishroom. These employees occasionally carry customers' trays and assist in general housekeeping.
Management	Supervising and training employees. Managers do not directly engage in production.
Storeroom department	Receiving and issuing raw material.
Cashier and checker	Issuing meal checks to customers and collecting cash.
Night and /or repair	Equipment repair and housekeeping activities. The housekeeping activities are generally performed after the cafeteria has closed for the day.

Exhibit D.—Description of Employee Work Activities

1. Cook meat	Cooks and butchers prepare and cook meat products. This activity includes trimming and cleaning meat products and being at attention to the cooking process.
2. Clean station	Kitchen personnel clean worktables and equipment.
3. Travel	Kitchen personnel transport food products and walk throughout work areas.
4. Miscellaneous	Personnel engaged in such activities as sharpening knives or performing work foreign to a specific job, such as a baker preparing salads.
5. Nonproductive	Personnel not engaged in productive activities such as cooking and clean station.
6. Cook vegetables	Cooks and other personnel prepare and cook vegetables. This activity includes peeling and trimming vegetables and being at attention to the cooking process.
7. Bake	Bakery personnel prepare and bake pastries and bread products. This activity includes mixing and cutting dough and being at attention to the baking process.
8. Prepare salads	Personnel prepare salads. This activity includes trimming and cutting green-leaved vegetables.
9. Wash pots and pans	Washers clean cooking utensils. This activity includes filling sinks with water, washing pots, and disposing of garbage.
10. Wash dishes	Personnel wash dishes. This activity includes garbage disposal, sorting soiled and clean dishware, and feeding the dish machine.
11. Clean kitchen	Personnel clean up the kitchen. This activity includes washing walls, mopping floors, and cleaning exhaust filters.
12. Clean dining area	Personnel clean up the dining area. This activity includes mopping and waxing floors in the dining room and serving line area; washing windows and walls; and cleaning decorative fixtures.
13. Wrap silver	Personnel wrap silverware in napkins. This activity includes sorting clean silver, wrapping silver, and stacking wrapped silver.
14. Setup	Serving line and utility personnel prepare the line before the meal period. This activity includes placement and arrangement of food products and general cleaning of the work station.
15. Serve	Serving-line personnel serve food to customers. This activity includes ladling soups, carving meat to order, serving vegetables, and being at attention to the serving process.
16. Maintain line	Serving-line and utility personnel maintain the line with food and remove food drippings. This activity includes carving meat ahead of orders and rearranging food in serving pans.
17. Tear down	Serving-line and utility personnel remove food from the serving line and clean up work stations after the meal period.
18. Travel	Tray girls and bus boys transport soiled dishes and trays and walk throughout work areas. This activity does not include carrying food products for customers.
19. Serve customers	Tray girls carry food for customers and arrange it on the table.
20. Wait pickup	Tray girls wait for customers at end of the serving line.
21. Clear tables	Tray girls and bus boys remove soiled dishware from the table. This activity includes cleaning the table with a damp cloth during the meal period.
22. Setup	Tray girls and bus boys fill condiment containers and clean tables and chairs before or after the period. This activity occurs only when the dining area is completely cleared of soiled dishes and tableware.

Tables

TABLE 12.—*Productive and actual cafeteria employee man-hours per 100 customers served in 6 single-line cafeterias* [1]

Department	Cafeteria A			Cafeteria B			Cafeteria C		
	Productive time per 100 customers	Actual time per 100 customers	Performance	Productive time per 100 customers	Actual time per 100 customers	Performance	Productive time per 100 customers	Actual time per 100 customers	Performance
	Man-hours	*Man-hours*	*Percent*	*Man-hours*	*Man-hours*	*Percent*	*Man-hours*	*Man-hours*	*Percent*
Meat	([2])	([2])	([2])	1.86	1.93	96.3	([2])	([2])	([2])
Vegetable	([2])	([2])	([2])	1.16	1.29	89.9	([2])	([2])	([2])
Total meat and vegetable	2.26	2.72	83.1	3.02	3.22	93.8	2.57	3.31	77.6
Dishroom	1.88	2.28	82.5	2.38	2.64	90.6	1.66	1.82	91.2
Pots and pans	.50	.69	72.5	([2])	([2])	([2])	.53	.63	84.1
Total warewashing	2.38	2.97	80.1	2.38	2.64	90.2	2.19	2.45	89.4
Serving line	4.77	5.45	87.5	3.92	5.26	74.5	3.62	4.81	75.3
Utility	([2])	([2])	([2])	([2])	([2])	([2])	.51	.72	70.8
Total serving and utility	4.77	5.45	87.5	3.92	5.26	74.5	4.13	5.53	74.7
Bakery	1.70	1.75	95.1	2.50	2.65	94.3	1.54	2.02	76.2
Salads	1.00	1.14	87.7	.99	1.12	88.4	.42	.48	87.5
Bus and tray	2.63	3.23	81.4	1.88	2.25	83.6	1.85	2.30	80.4
Total direct labor	14.74	17.26	85.4	14.69	17.14	85.7	12.70	16.09	78.9
Management	2.08	2.08	100.0	1.76	1.76	100.0	1.21	1.21	100.0
Storeroom	.23	.23	100.0	.11	.11	100.0	([2])	([2])	([2])
Checker and cashier	2.10	2.10	100.0	2.17	2.17	100.0	.80	.80	100.0
Night and/or repair	([2])	([2])	([2])	.57	.57	100.0	([2])	([2])	([2])
Total indirect labor	4.41	4.41	100.0	4.61	4.61	100.0	2.01	2.01	100.0
Grand total	19.15	21.67	88.4	19.30	21.75	88.7	14.71	18.10	81.3

Department	Cafeteria D			Cafeteria E			Cafeteria F			Average		
	Productive time per 100 customers	Actual time per 100 customers	Performance	Productive time per 100 customers	Actual time per 100 customers	Performance	Productive time per 100 customers	Actual time per 100 customers	Performance	Productive time per 100 customers	Actual time per 100 customers	Performance
	Man-hours	*Man-hours*	*Percent*	*Man-hours*	*Man-hours*	*Percent*	*Man-hours*	*Man-hours*	*Percent*	*Man-hours*	*Man-hours*	*Percent*
Meat	2.04	2.40	85.0	([2])	([2])	([2])	([2])	([2])	([2])	([2])	([2])	([2])
Vegetable	.60	.97	61.9	([2])	([2])	([2])	([2])	([2])	([2])	([2])	([2])	([2])
Total meat and vegetable	2.64	3.37	78.3	4.09	4.43	92.3	2.22	2.77	80.1	2.80	3.30	84.8
Dishroom	2.42	3.12	77.5	2.15	2.53	85.0	2.20	3.01	73.1	([2])	([2])	([2])
Pots and pans	.79	.86	91.9	([2])	([2])	([2])	.86	.99	86.9	([2])	([2])	([2])
Total warewashing	3.21	3.98	80.7	2.15	2.53	85.0	3.06	4.00	76.5	2.56	3.10	82.6
Serving line	4.03	4.94	81.6	4.60	5.53	83.2	4.29	6.18	69.4	([2])	([2])	([2])
Utility	.40	.58	69.0	([2])	([2])	([2])	.93	1.02	91.2	([2])	([2])	([2])
Total serving and utility	4.43	5.52	80.3	4.60	5.53	83.2	5.22	7.20	72.5	4.51	5.75	78.4
Bakery	1.50	1.80	83.3	1.76	1.83	96.2	.88	1.02	86.3	1.65	1.85	89.2
Salads	1.34	1.59	84.9	1.33	1.60	83.1	1.15	1.28	89.8	1.04	1.20	86.7
Bus and tray	3.49	5.39	64.9	2.12	2.81	75.4	2.32	3.18	73.0	2.38	3.19	74.6
Total direct labor	16.61	21.65	76.7	16.05	18.73	85.7	14.85	19.45	76.3	14.94	18.39	81.2
Management	2.42	2.42	100.0	1.37	1.37	100.0	2.19	2.19	100.0	1.83	1.83	100.0
Storeroom	.41	.49	83.7	.98	1.15	85.2	.58	.58	100.0	.39	.43	90.7
Checker and cashier	.97	.97	100.0	1.01	1.01	100.0	.93	.93	100.0	1.33	1.33	100.0
Night and/or repair	.93	.93	100.0	([2])	([2])	([2])	.93	.93	100.0	.41	.41	100.0
Total indirect labor	4.73	4.81	98.3	3.36	3.53	95.2	4.63	4.63	100.0	3.96	4.00	99.0
Grand total	21.34	26.46	80.7	19.41	22.26	87.2	19.48	24.08	80.9	18.90	22.39	84.4

[1] "Productive time per 100 customers" was developed by the application of work sampling percentages for productive work, performance-rating factors and a personal and rest allowance to the "actual time per 100 customers."

[2] Indicates combined work activity which could not be separated using work samplings.

TABLE 13.—*Productive and actual cafeteria employee man-hours per 100 customers served in 6 double-line cafeterias* [1]

Department	Cafeteria G			Cafeteria H			Cafeteria I		
	Productive time per 100 customers	Actual time per 100 customers	Performance	Productive time per 100 customers	Actual time per 100 customers	Performance	Productive time per 100 customers	Actual time per 100 customers	Performance
	Man-hours	*Man-hours*	*Percent*	*Man-hours*	*Man-hours*	*Percent*	*Man-hours*	*Man-hours*	*Percent*
Meat	([2])	([2])	([2])	1.65	1.95	([2])	([2])	([2])	([2])
Vegetable	([2])	([2])	([2])	.79	.95	([2])	([2])	([2])	([2])
Total meat and vegetable	2.97	5.50	54.0	2.44	2.90	84.1	1.76	2.17	81.1
Dishroom	1.99	2.99	66.6	1.71	1.93	88.6	1.73	2.31	74.9
Pots and pans	.66	.92	71.7	.48	.60	80.0	.39	.44	88.6
Total warewashing	2.65	3.91	67.8	2.19	2.53	86.6	2.12	2.75	77.1
Serving line	2.78	4.89	56.9	3.39	5.73	59.2	3.53	5.24	67.4
Utility	1.52	2.39	63.6	.79	1.25	63.2	.97	1.05	92.4
Total serving and utility	4.30	7.28	59.1	4.18	6.98	60.0	4.50	6.29	71.5
Bakery	.68	1.24	54.8	1.16	1.74	66.7	.98	1.23	79.7
Salads	.59	.82	72.0	1.22	1.54	79.2	.94	1.06	88.7
Bus and tray	1.69	2.78	60.8	4.37	6.26	69.8	2.31	3.24	71.3
Total direct labor	12.88	21.53	59.8	15.56	21.95	70.9	12.61	16.74	75.3
Management	1.70	1.70	100.0	3.66	3.66	100.0	1.33	1.33	100.0
Storeroom	.46	.46	100.0	.51	.51	100.0	([2])	([2])	([2])
Checker and cashier	1.61	1.61	100.0	1.43	1.43	100.0	1.16	1.16	100.0
Night and/or repair	1.75	1.75	100.0	1.05	1.05	100.0	.50	.50	100.0
Total indirect labor	5.52	5.52	100.0	6.65	6.65	100.0	2.99	2.99	100.0
Grand total	18.40	27.05	68.0	22.21	28.60	77.7	15.60	19.73	79.1

Department	Cafeteria J			Cafeteria K			Cafeteria L			Average		
	Productive time per 100 customers	Actual time per 100 customers	Performance	Productive time per 100 customers	Actual time per 100 customers	Performance	Productive time per 100 customers	Actual time per 100 customers	Performance	Productive time per 100 customers	Actual time per 100 customers	Performance
	Man-hours	*Man-hours*	*Percent*	*Man-hours*	*Man-hours*	*Percent*	*Man-hours*	*Man-hours*	*Percent*	*Man-hours*	*Man-hours*	*Percent*
Meat	1.63	2.08	78.4	1.09	1.33	82.0	([2])	([2])	([2])	([2])	([2])	([2])
Vegetable	.64	.81	79.0	.79	.94	84.0	([2])	([2])	([2])	([2])	([2])	([2])
Total meat and vegetable	2.27	2.89	78.5	1.88	2.27	82.8	1.28	1.66	77.1	2.10	2.90	72.4
Dishroom	1.43	2.00	71.5	1.52	2.10	72.4	2.10	2.59	81.1	1.75	2.32	75.4
Pots and pans	.34	.46	73.9	.37	.51	72.6	.28	.33	84.9	.42	.54	77.8
Total warewashing	1.77	2.46	72.0	1.89	2.61	72.4	2.38	2.92	81.5	2.17	2.86	75.9
Serving line	3.30	5.93	55.7	2.71	4.18	64.8	3.48	4.36	79.8	3.20	5.06	63.2
Utility	.63	1.09	57.8	2.15	2.70	79.6	1.65	2.11	78.2	1.29	1.77	72.9
Total serving and utility	3.93	7.02	56.0	4.86	6.88	70.6	5.13	6.47	79.3	4.49	6.83	65.7
Bakery	1.05	1.54	68.2	([3])	([3])	([3])	([3])	([3])	([3])	.65	.96	67.7
Salads	.89	1.11	80.2	.89	1.10	80.9	.41	.47	87.2	.82	1.02	80.4
Bus and tray	1.66	3.21	51.7	2.61	4.01	65.1	3.04	3.18	96.0	2.61	3.78	69.0
Total direct labor	11.57	18.23	63.5	12.13	16.87	71.9	12.24	14.70	83.3	12.84	18.35	70.0
Management	2.22	2.22	100.0	2.02	2.02	100.0	1.18	1.18	100.0	2.02	2.02	100.0
Storeroom	([2])	([2])	([2])	.80	.95	84.2	.20	.20	100.0	.33	.35	94.3
Checker and cashier	1.91	1.91	100.0	1.00	1.00	100.0	1.65	1.65	100.0	1.46	1.46	100.0
Night and/or repair	.21	.21	100.0	.94	.94	100.0	.44	.44	100.0	.82	.82	100.0
Total indirect labor	4.34	4.34	100.0	4.76	4.91	96.9	3.47	3.47	100.0	4.63	4.65	99.6
Grand total	15.91	22.57	70.5	16.89	21.78	77.5	15.71	18.17	86.5	17.17	23.00	76.0

[1] "Productive time per 100 customers" was developed by the application of work sampling percentages for productive work, performance-rating factors, and a personal and rest allowance to the "actual time per 100 customers."

[2] Indicates combined work activity which could not be separated using work samplings.

[3] Supplied from a commercial bakery which produced for more than 1 operation.

TABLE 14.—*Size of area by function for 6 single-line cafeterias*

Area description	Cafeteria A		Cafeteria B		Cafeteria C		Cafeteria D	
	Area	Ratio of area to total	Area	Ratio of area to total	Area	Ratio of area to total	Area	Ratio of area to total
	Square feet	*Percent*	*Square feet*	*Percent*	*Square feet*	*Percent*	*Square feet*	*Percent*
Dining room	5,070	43.2	3,406	35.6	3,408	42.2	3,774	29.4
Customer waiting	895	7.6	477	5.0	605	7.5	746	5.8
Serving line and cashier	547	4.7	1,218	12.8	871	10.8	1,076	8.4
Dishroom	488	4.1	395	4.1	286	3.5	516	4.0
Pots and pans	124	1.1	156	1.6	120	1.5	240	1.9
Meat and vegetable cooking	471	4.0	377	4.0	600	7.4	627	4.9
Meat and/or vegetable preparation.			490	5.1	121	1.5	280	2.2
Salad	228	1.9	210	2.2	226	2.8	311	2.4
Bakery	636	5.4	520	5.4	420	5.2	573	4.4
Walk-in coolers	409	3.5	64	.7	154	1.9	291	2.3
Storeroom	323	2.8	585	6.1	302	3.7	540	4.2
Trash room	194	1.7	140	1.5			140	1.1
Equipment room			396	4.1	216	2.7	363	2.8
Receiving dock	380	3.2					218	1.7
Office	206	1.8	88	.9	59	.7	95	.7
Customer restrooms	288	2.5	359	3.8	154	1.9	410	3.2
Employees lounge and lockers	352	3.0	187	2.0	355	4.4	1,616	12.6
Miscellaneous aisles, etc.	1,117	9.5	488	5.1	183	2.3	1,032	8.0
Total	11,728	100.0	9,556	100.0	8,080	100.0	12,848	100.0
	Number		*Number*		*Number*		*Number*	
Seating capacity	332		300		262		249	

Area description	Cafeteria E		Cafeteria F		Total area	Average		
	Area	Ratio of area to total	Area	Ratio of area to total		Area	Ratio of area to total	Area per seat
	Square feet	*Percent*	*Square feet*	*Percent*	*Square feet*	*Square feet*	*Percent*	*Square feet*
Dining room	3,479	37.2	3,360	30.0	22,497	3,750	35.9	14.3
Customer waiting	584	6.2	1,410	12.6	4,717	786	7.5	3.0
Serving line and cashier	960	10.3	1,242	11.1	5,914	986	9.4	3.8
Dishroom	431	4.6	444	4.0	2,560	427	4.1	1.6
Pots and pans	144	1.5	96	.9	880	147	1.4	0.6
Meat and vegetable cooking	364	3.9	757	6.7	3,196	533	5.1	2.0
Meat and/or vegetable preparation.	386	4.1	442	3.9	1,719	286	2.7	1.1
Salad	407	4.3	179	1.6	1,561	260	2.5	1.0
Bakery	367	3.9	648	5.8	3,164	527	5.0	2.0
Walk-in coolers	156	1.7	516	4.6	1,590	265	2.5	1.0
Storeroom	411	4.4	422	3.8	2,583	431	4.1	1.6
Trash room			20	.2	494	82	0.8	.3
Equipment room	104	1.1	405	3.6	1,484	247	2.4	.9
Receiving dock			20	.2	618	103	1.0	.4
Office	82	.9	146	1.3	676	113	1.1	.4
Customer restrooms	161	1.7	346	3.1	1,718	286	2.7	1.1
Employees lounge and lockers	609	6.5	432	3.8	3,551	592	5.7	2.3
Miscellaneous aisles, etc.	719	7.7	318	2.8	3,857	643	6.1	2.5
Total	9,364	100.0	11,203	100.0	62,779	10,464	100.0	39.9
	Number		*Number*		*Number*		*Number*	
Seating capacity	200		227		1,570		262	

TABLE 15.—*Size of area by function, for 6 double-line cafeterias*

Area description	Cafeteria G		Cafeteria H		Cafeteria I		Cafeteria J	
	Area	Ratio of area to total	Area	Ratio of area to total	Area	Ratio of area to total	Area	Ratio of area to total
	Square feet	*Percent*	*Square feet*	*Percent*	*Square feet*	*Percent*	*Square feet*	*Percent*
Dining room	4,665	25.9	4,530	34.0	6,261	46.8	7,443	39.1
Customer waiting	711	4.0	979	7.3	1,104	8.3	2,007	10.5
Serving line and cashier	1,392	7.7	1,250	9.4	1,853	13.8	1,660	8.7
Dishroom	356	2.0	306	2.3	276	2.0	839	4.4
Pots and pans	133	.7	230	1.7	131	1.0	247	1.3
Meat and vegetable cooking	498	2.8	433	3.3	355	2.7	920	4.8
Meat and/or vegetable preparation.	335	1.9	158	1.2	270	2.0	120	.6
Salad	91	.5	548	4.1	195	1.5	669	3.5
Bakery	344	1.9	537	4.0	525	3.9	603	3.2
Walk-in coolers	410	2.3	352	2.6	426	3.2	303	1.6
Storeroom	820	4.6	719	5.4	568	4.2	674	3.5
Trash room	162	.9	100	.8	288	2.2	240	1.3
Equipment room	1,535	8.5	370	2.8	----------	----------	162	.9
Receiving dock	----------	----------	----------	----------	----------	----------	----------	----------
Office	464	2.6	215	1.6	28	.2	80	.4
Customer restrooms	249	1.4	312	2.3	216	1.6	437	2.3
Employees lounge and lockers	2,030	11.3	800	6.0	223	1.7	626	3.3
Miscellaneous aisles, etc.	3,800	21.0	1,495	11.2	662	4.9	2,018	10.6
Total	17,995	100.0	13,334	100.0	13,381	100.0	19,048	100.0
	Number		*Number*		*Number*		*Number*	
Seating capacity	402		315		469		496	

Area description	Cafeteria K		Cafeteria L		Total area	Average		
	Area	Ratio of area to total	Area	Ratio of area to total		Area	Ratio of area to total	Area per seat
	Square feet	*Pereent*	*Square feet*	*Pereent*	*Square feet*	*Square feet*	*Pereent*	*Square feet*
Dining room	6,065	33.5	6,000	35.7	34,964	5,827	35.5	13.7
Customer waiting	1,703	9.5	325	1.9	6,829	1,138	6.9	2.7
Serving line and cashier	2,010	11.2	1,812	10.8	9,977	1,663	10.1	3.9
Dishroom	717	4.0	575	3.4	3,069	512	3.1	1.2
Pots and pans	200	1.1	106	.6	1,047	175	1.1	.4
Meat and vegetable cooking	986	5.5	952	5.7	4,144	691	4.2	1.6
Meat and/or vegetable preparation.	355	2.0	237	1.4	1,475	246	1.5	.6
Salad	297	1.6	260	1.5	2,060	343	2.1	.8
Bakery	372	2.1	411	2.4	2,792	465	2.8	1.1
Walk-in coolers	320	1.8	428	2.5	2,239	373	2.3	.9
Storeroom	964	5.4	895	5.3	4,640	773	4.7	1.8
Trash room			98	.6	888	148	.9	.3
Equipment room	537	3.0	105	.6	2,709	452	2.8	1.1
Receiving dock	378	2.1	1,220	7.3	1,598	266	1.6	.6
Office	62	.3	268	1.6	1,117	186	1.1	.4
Customer restrooms	400	2.2	262	1.6	1,876	313	1.9	.7
Employees lounge and lockers	1,212	6.7	649	3.9	5,540	923	5.6	2.2
Miscellaneous aisles, etc.	1,436	8.0	2,202	13.2	11,613	1,936	11.8	4.5
Total	18,014	100.0	16,805	100.0	98,577	16,430	100.0	38.5
	Number		*Number*		*Number*	*Number*		
Seating capacity	424		452		2,556	426		

☆ U.S. GOVERNMENT PRINTING OFFICE: 1968 O—317-941