1969

A Comparative Engineering Analysis of Food Service Operations

Adolf Carl Hock
Central Washington University

337

A COMPARATIVE ENGINEERING ANALYSIS OF FOOD SERVICE OPERATIONS

A Thesis

Presented to

the Graduate Faculty

Central Washington State College

In Partial Fulfillment

of the Requirements for a

Master of Education Degree

---

by

Adolf Karl Hoch

June, 1969

APPROVED FOR THE GRADUATE FACULTY

_____

Luther G. Baker, Jr., COMMITTEE CHAIRMAN

_____

Myrtle Carlson

_____

Robert B. Smawley

ACKNOWLEDGMENT

The writer wishes to express special and sincere thanks to DR. ROBERT SMAWLEY for suggesting the problem, and for his assistance and encouragement throughout this study.

TABLE OF CONTENTS

CHAPTER Page

CHAPTER Page

TABLE OF CHARTS AND FIGURES

CHAPTER I

BACKGROUND OF THE PROBLEM

The advances in science and technology have brought a big change in the food service industry. The scramble line method (operating on the Self-Service Shopping Center principle) is one of the latest entries in the field. However, the combination of scramble and a la carte lines (a la carte meaning pre-selected items cooked to order) is the latest in food service design advancement. Studies on conventional cafeteria lines (conventional lines meaning one person following behind another through a set pattern) were charted by Kazarian (4:55-57). He described the serving line rate and average dining time per person, which were of particular importance since they were used to determine the seating requirements for the dining area.

Kazarian further studied the serving time per person, the number of people in the serving line, and the number of people in the dining room.

Information in regard to operation and design of cafeteria systems has been reported by Chartrand (1:122-25). He presented

basic planning principles which were translated into mathematical formulas. These formulas can be applied in the design of cafeteria lines. The main emphasis, however, was placed on the analysis of delays in service on the line. Dukas (2:18-21) method described the factors in determining the seating capacity for cafeterias by multiplying the serving line rate by the peak meal period and dividing the product by the turnover of the seat during that period. He allowed a 15 percent safety factor for seats that may not be occupied. This method requires the knowledge of the serving line rate, number of people served per minute and the seat turnover. The number of seats can be determined if the average dining time per person is known.

Schneider and John (5:258) have shown a formula for determining the minimum number of seats for a cafeteria dining room. The basic difference between the method of Dukas and that of Schneider and John for determining seating capacity is the serving line rate that is used. Dukas used the peak serving line rate, while Schneider and John's method uses the average serving line rate. Schneider and John's method is determined by dividing the total number of people served by the total dining period.

PURPOSE OF THE STUDY AND STATEMENT OF THE PROBLEM

The purpose of the study was to measure objectively the effectiveness of the a la carte and scramble systems in each of the three Central Washington State College dining halls--East Holmes, West Holmes, and the Commons. No data at this time were available for the new system as it pertains to the serving line rate, the serving time per person, the number of people in the serving line, the dining time per person and the number of people in the dining room.

By applying Kazarian's method in determining the efficiency of the cafeterias, this study will attempt to answer the following questions: (1) Are the maximum number of students that the dining hall can serve under the present system being accommodated? (2) What differences exist between dining halls in serving time and the time it takes a student to eat?

Long lines in cafeterias tend to bring out the short tempers of the students. This was borne out by an article in the January 26, 1968, issue of the C.W.S.C. Campus Crier by Alice Johnson, News Editor, titled "Upper Campus Picketers Protest Food." Miss Johnson pointed out that the long lines at Holmes were a major factor in the protest.

"Where dining is best there is no unrest." Further confrontations like the one mentioned can be avoided by recognizing that a

problem exists, by assessing the causes of the problem and seeking solutions to the causes. "How the line flows, so the dining goes."

SIGNIFICANCE OF THE STUDY

It is hoped by the author that the results of this study may be of both local and general service. First, it is hoped that it may be to the C.W.S.C. campus community a guideline to more efficient dining service. It is believed that when each dining area is operating under maximum calculated efficiency, an exact determination of total seating capacity will be realized. Thus, it may give a key to the future needs for expansion so necessary to growing resident college campuses. Secondly, this study will serve as a general advancement of knowledge of institutional feeding, specifically for educational food services.

LIMITATIONS OF THE STUDY

This study was concerned primarily with the adequacy of the present system of serving, the efficiency in time of service, and the time spent in the dining room.

It is recognized that the accuracy of the times measured is limited by the fact that students may spend some of the time in

conversation and other activities which are not actually a part of service or eating. It is also apparent that the greatest effect of this limitation was in the dining hall.

Breakfast and dinner will not be used for study. The peak hour of the day, the lunch period, was selected for the study. The hours are 11:15 a.m. to 12:15 p.m. The quality or type of food served is not a part of this study.

METHODS OF RESEARCH AND SOURCE OF DATA

The operations research techniques for human engineering analysis of Kazarian were applied. The data for analyzing the cafeteria operations at C.W.S.C. was taken by counting the number of people who passed a certain point in the cafeteria. The tally was recorded on a manual counter and the accumulated figures were recorded at five-minute intervals on tally cards.

The "serve in" count was taken at the entrance to the respective serving lines and the "serve out" count was taken as the students arrived at the check stand. The difference between the "serve in" and the "serve out" count measures the time spent in the serving line. The "dine in" count began as the students entered the dining room and the "dine out" count was taken as the students left. The difference between the "dine in" and the "dine out" is a

measure of time spent in the dining room and not necessarily the average eating time per student.

The first part of the study was conducted at Commons for five days, Monday through Friday. The seating capacity of Commons is 550. The serving lines are combination a la carte and scramble. The population is co-educational.

The second part of the study was conducted simultaneously at East and West Holmes for five days, Monday through Friday. The serving lines at East and West Holmes are also a combination of a la carte and scramble. The seating capacity at East Holmes is 450 and at West Holmes 500. The population is co-educational.

CHAPTER II

STUDY DESIGN

The Time Sampling Design

This study was conducted in three Central Washington State College dining halls: Commons, East Holmes, and West Holmes.

Part one of the study was conducted in the Commons Cafeteria. The study began May 5, 1969, and ended May 9, 1969. During each of these five days, observations were made from 11:15 a.m. to 12:15 p.m. by four timekeepers.

The Commons dining facility, located in the Commons building, has two dining rooms with a total seating capacity of 550 accommodating the population which is co-educational. The serving system is a basic scramble method with one a la carte hot food station. For further details, see Appendix, page 73.

Part two of the study was conducted at East and West Holmes dining halls, for the five-day period beginning May 12 and ending May 16. The dining lines were observed from 11:15 a.m. to 12:15 p.m. by four timekeepers.

East Holmes is the east wing of the Holmes complex. The serving system is a basic scramble method with one a la carte hot

food station. East Holmes has three dining rooms with a total seating capacity of 450 accommodating the population which is co-educational. For further descriptive details, see Appendix, page 70.

West Holmes is the west wing of the Holmes complex. The serving system is also a basic scramble method with one a la carte hot food station. Two dining rooms with a total seating capacity of 500 accommodate the population which is co-educational. For further details, see Appendix, page 70.

Procedures Used

During the peak luncheon time period, from 11:15 a.m. to 12:15 p.m., students were randomly selected at five-minute intervals and timed as they passed five different check points: "serve in," "serve out," "dine in," "dine out," and a count of total seat turnover. Students were unaware they were being timed. Each timekeeper used a watch with a sweep second hand, a tally card, and a pencil. In addition, those checking the serving time used stopwatches.

The responsibilities were divided as follows: Timekeeper 1 timed the a la carte serving time. Timekeeper 2 timed the scramble serving time. Timekeepers 1 and 2 recorded the "serve in" and "serve out." The difference between the times was considered the

serving time per person. In addition, the total number of people passing through each line was tallied.

Timekeeper 3 recorded the "dine in" and "dine out" time of those students who had been timed through the serving line. The difference between these times was considered the dining time. Timekeeper 4 counted the total number of people entering the leaving the dining room during five-minute intervals. By subtracting the number of people leaving the dining room from those entering, the average number of people in the dining room was derived. The serving line rate was calculated at five-minute intervals by counting the number of students who passed through the line between each of the randomly selected students, a new student being selected at the beginning of each five-minute period.

Data collected were totaled and averaged each day, then recorded on a separate chart for each dining hall. At the end of the five-day period, accumulative totals were charted for each hall. At the close of the study, the data from all the halls were combined for the institutional average for future reference. (See Appendix, pages 67 and 68.

The Schneider-John formula will be used to show, theoretically, the minimum amount of seating space required for present student needs. Comparison of actual utilization of numbers and percentages will be used to show the actual usage of the dining hall.

Schneider-John formula:

$$S = \frac{(m)}{\frac{L}{t} - 1} \; d$$

where S = number of seats

m = total number of meals to be served

1 = length of dining time period

t = average time required for eating

(15%) d = diversity factor seat usage

CHAPTER III

DATA ANALYSIS AND DISCUSSION

Results of the Study

The purpose of the study is to measure objectively the efficiency of the a la carte and scramble systems, plus the seating capacity utilization, in each of the three dining halls: East Holmes, West Holmes, and Commons.

Since the a la carte and the scramble systems are two different methods of service, the data are presented separately. The observed data of the a la carte system is analyzed on Chart 1.

The study shows that the serving time per person was as follows: Commons was best; East Holmes, second; and West Holmes, slowest.

The number of people in serving line was shortest at Commons; West Holmes was second; and East Holmes was slowest.

The serving line rate was best at Commons; East Holmes was second; and West Holmes was slowest.*

---

* Since the a la carte system is qualitative rather than quantitative, the serving line rate is fairly meaningless because of its infrequent use on certain days.

CHART I

FIVE-DAY SUMMARY OF SERVING AND DINING TIME

(A LA CARTE SYSTEM)

Dining Hall	Serving Time per person in seconds	Number of People in Serving Line	Serving Line Rate	Dining Time per person in minutes	Number of People in D. R. each 5 min.
East Holmes	256	4.4	6.2	27	136
West Holmes	276	3.3	4.7	19.7	128
Commons	152	2.8	6.7	19.3	143

The dining time per person was fastest in Commons; second best was West Holmes; and East Holmes was slowest.

The number of people in the Dining Room was the same for the two systems. Commons had the highest average number of students; East Holmes was second; and West Holmes was lowest.

The observed data of the scramble system is analyzed on Chart 2, page 14.

The study shows that the serving time per person was as indicated in Chart 2. Commons was best; East Holmes, second best; and West Holmes was slowest.

Commons had the least number of people in the serving line; West Holmes was second; and East Holmes had the greatest number in line.

The serving line rate was the same at Commons and East Holmes; West Holmes was slightly slower.

The dining time per person was fastest at West Holmes; Commons was slightly longer; and East Holmes was longest.

CHART 2

FIVE-DAY SUMMARY OF SERVING AND DINING TIME

(SCRAMBLE SYSTEM)

Dining Hall	Serving Time per person in seconds	Number of People in Serving Line	Serving Line Rate	Dining Time per person in minutes	Number of People in D. R. each 5 min.
East Holmes	66	10.7	36	23.5	136
West Holmes	77	8	35	20.4	128
Commons	47	5.6	36	20.5	143

Applying Schneider and John's formula, the best seat utilization is at East Holmes; West Holmes is second; and Commons is the lowest. The data are shown in Chart 3, page 16.

Actual present average utilization of seating capacity, presented in Chart 4, page 16, showed the best seat utilization to be at East Holmes; Commons as second; and West Holmes as the least. The difference in percentage of seats not used between Schneider and John's formula and the actual utilization is probably due in part to the student absentee factor.

CHART 3

MINIMUM NUMBER OF SEATS USED, ACCORDING TO SCHNEIDER AND JOHN

Dining Hall	Assigned Number of People to be Fed	Present Seating Capacity	Minimum No. of Seats Needed acc. S & J	Number of Seats Not Utilized	% of Seats Utilized
East Holmes	920	450	258	192	57%
West Holmes	850	500	200	300	40%
Commons	885	550	210	340	38%

CHART 4

ACTUAL PRESENT UTILIZATION OF SEATING CAPACITY

Dining Hall	Assigned Number of People to be Fed	Present Seating Capacity	Actual No. of Seats Utilized	Number Seats Not Utilized	% of Seats Utilized
East Holmes	920	450	214	236	47%
West Holmes	850	500	203	297	41%
Commons	885	550	242	308	44%

Analysis and Discussion

The analysis of observed data shows that the a la carte and scramble systems at East and West Holmes mainly are plagued by the same problem of traffic flow. The same problem is true to a lesser degree at Commons, as shown in Figures 1, 2, and 3, pages 18, 19, and 20, respectively.

As seen in Figures 1, 2, and 3, the basic principle of continuous forward flow is violated by crossing lines and backtracking, which causes people to bump into each other and causes a delay in time.

The a la carte lines at East and West Holmes have one more problem which seems to be a major one--that of slow service. It was apparent to the author that the cooks on the a la carte lines are not adequately trained for speed in short order cooking, thus adding more delay. It is realized this condition may be, in part, due to part-time student help and possibly frequent turnover of employees.

The study points out that the three dining halls (East Holmes, West Holmes, and Commons) actually operate at present with less than 50 percent of total seat utilization, thus giving the college room for future growth without additional dining areas.

Figure 1

Scramble System -- East Holmes

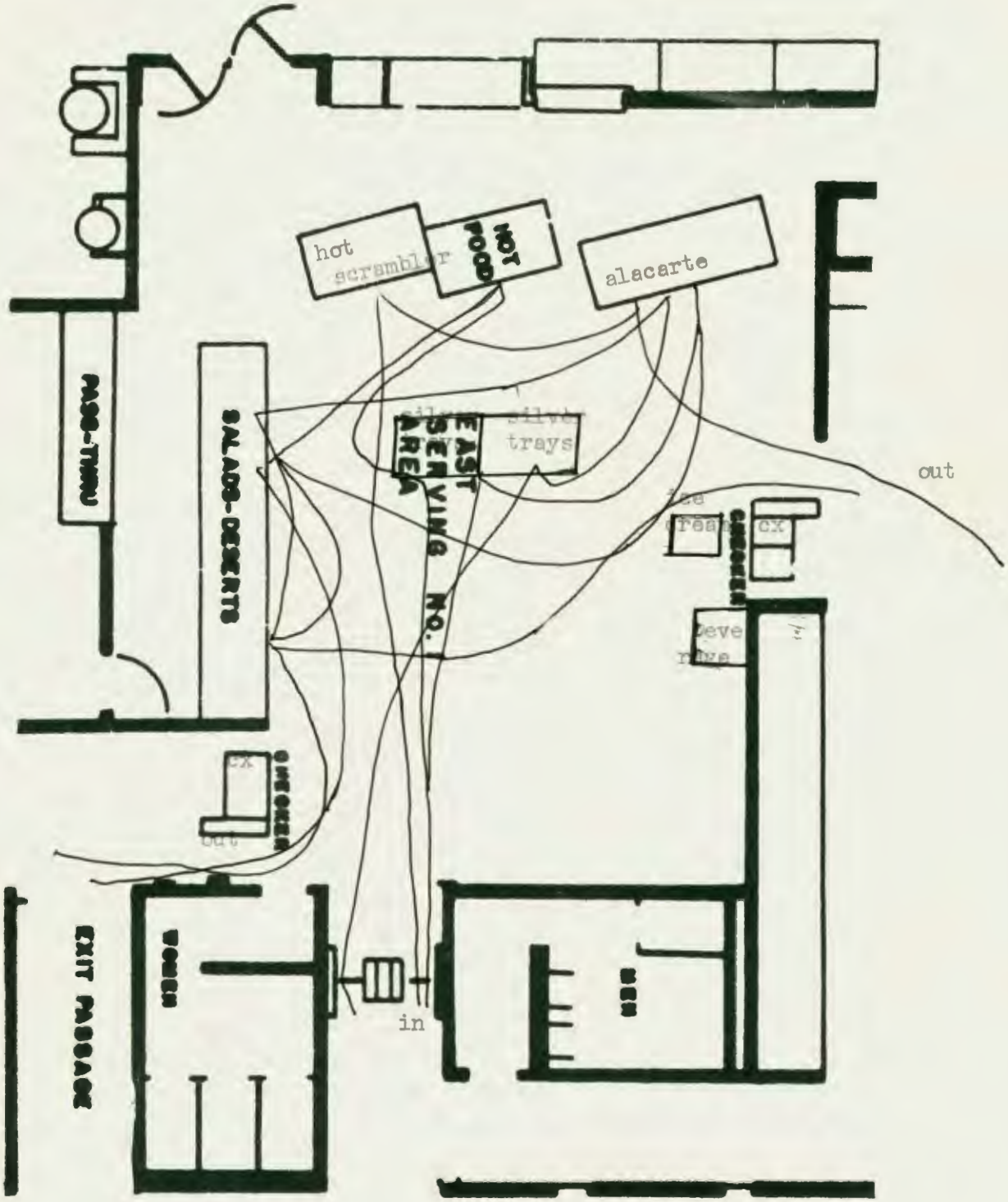


Figure 2

Scramble System -- West Holmes

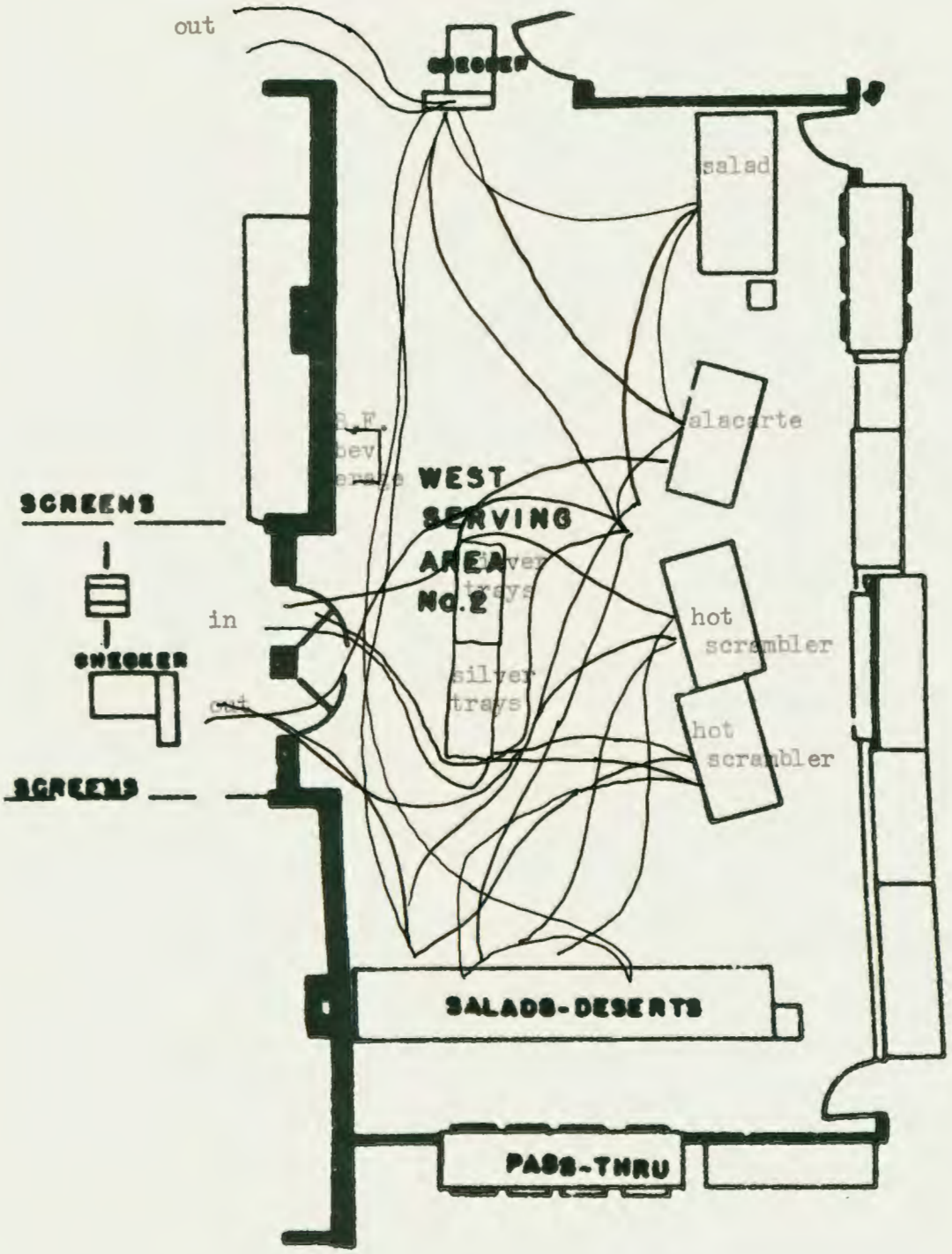
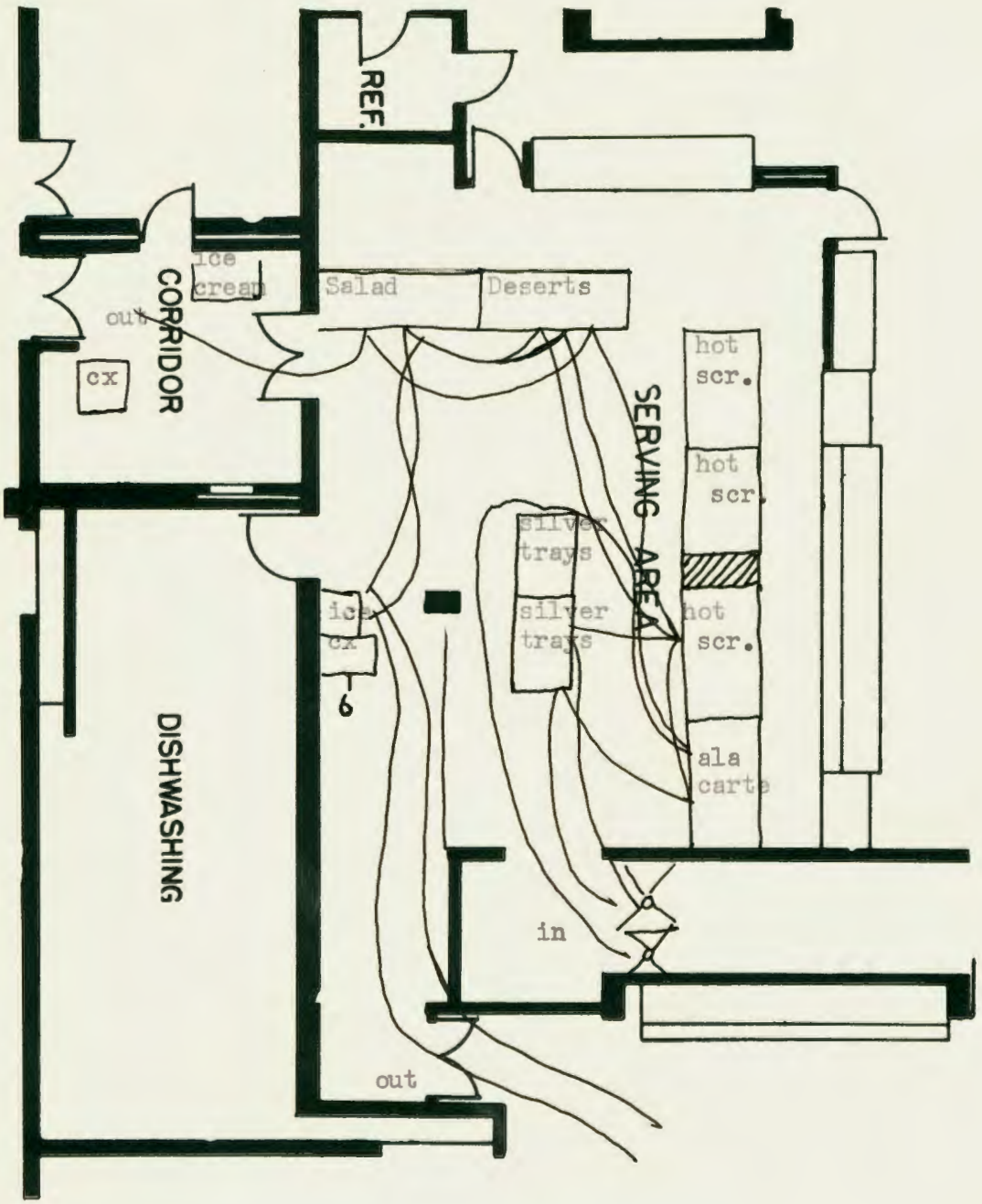


Figure 3

Scramble System -- Commons



CHAPTER IV

SUMMARY, CONCLUSIONS, AND FINAL RECOMMENDATIONS

Summary

The five-day study to measure objectively the efficiency of the a la carte and scramble systems and utilization of seating capacity in each of the three dining halls (East Holmes, West Holmes, and Commons) has shown that Commons had the most efficient operation of both systems. East and West Holmes were both plagued with faulty traffic flow in both the a la carte and scramble areas. In addition, the a la carte service was extremely slow.

The seating capacity was utilized less than 50% in all three dining halls. The dining time per person was longest at East Holmes in both the scramble and the a la carte system. The shortest dining time per person was in the Commons dining room with only a marginal difference between the a la carte and scramble system. The dining time for West Holmes was almost identical to Commons. The serving times per person in the scramble system were also almost identical at West Holmes and Commons.

Conclusions

The analysis of observed data has shown the a la carte and scramble service at Commons is operated with a minimal number of problems. The traffic pattern was relatively unobstructed, although occasional bumping and backtracking could be observed. The a la carte and scramble in Commons is good. There was a 44 percent utilization of the dining room seating capacity in Commons.

The a la carte and scramble system in East and West Holmes were both hampered by a traffic flow problem. (See Figures 1, 2, and 3, pages 18, 19, and 20.) The students have to cross traffic and backtrack. The author suggests that a revision of the traffic flow would be an answer to the slow moving traffic problem in all three serving areas. A new method which the author proposes as a possible solution to the problem is referred to as "Scat-A-Pat" (scatter after a pattern). See Figures A, B, and C, pages 25, 26, and 27. "Scat-A-Pat" would result in smoother, faster flow of traffic with elimination of traffic crossing and backtracking.

The "Scat-A-Pat" system was designed by the author utilizing only the present existing equipment and simply rearranging this equipment for a more efficient traffic flow pattern. Costs for this would be minimal.

The a la carte service at East and West Holmes has the additional problem of slow service. It is suggested this could be

alleviated by a special training course in efficient short order cooking methods for employees.

This study has shown utilization of the present dining hall capacity to be about 50 percent of its maximum, thus indicating these facilities are most adequate for present needs.

It is concluded by the author that this study has accomplished its purposes. First, it has measured objectively the effectiveness of the a la carte and scramble systems in each of the three Central Washington State College dining halls, and has provided data concerning the new system pertaining to the serving line rate, the serving time per person, the number of people in the serving line, the dining time per person, and the number of people in the dining room.

The study does provide data for Central Washington State College which can be used to determine an exact total seating capacity for possible future growth.

It is further felt that the data will be of help and interest to other educational food services programs.

Recommendations for Further Study

First, to develop data showing maximum seating capacity for future use in dining hall needs.

Second, when "Scat-A-Pat" is incorporated, a follow-up study to verify its efficiency.

Third, periodic workshops for short order cooks and a la carte employees from all dining halls be jointly conducted to maintain maximum efficiency in service.

Fourth, a study of service line employees should be made considering the number of employees needed in each station and a possible relationship of the male and female ratio to speed of service.

Figure A

"SCAT-A-PAT" -- East Holmes

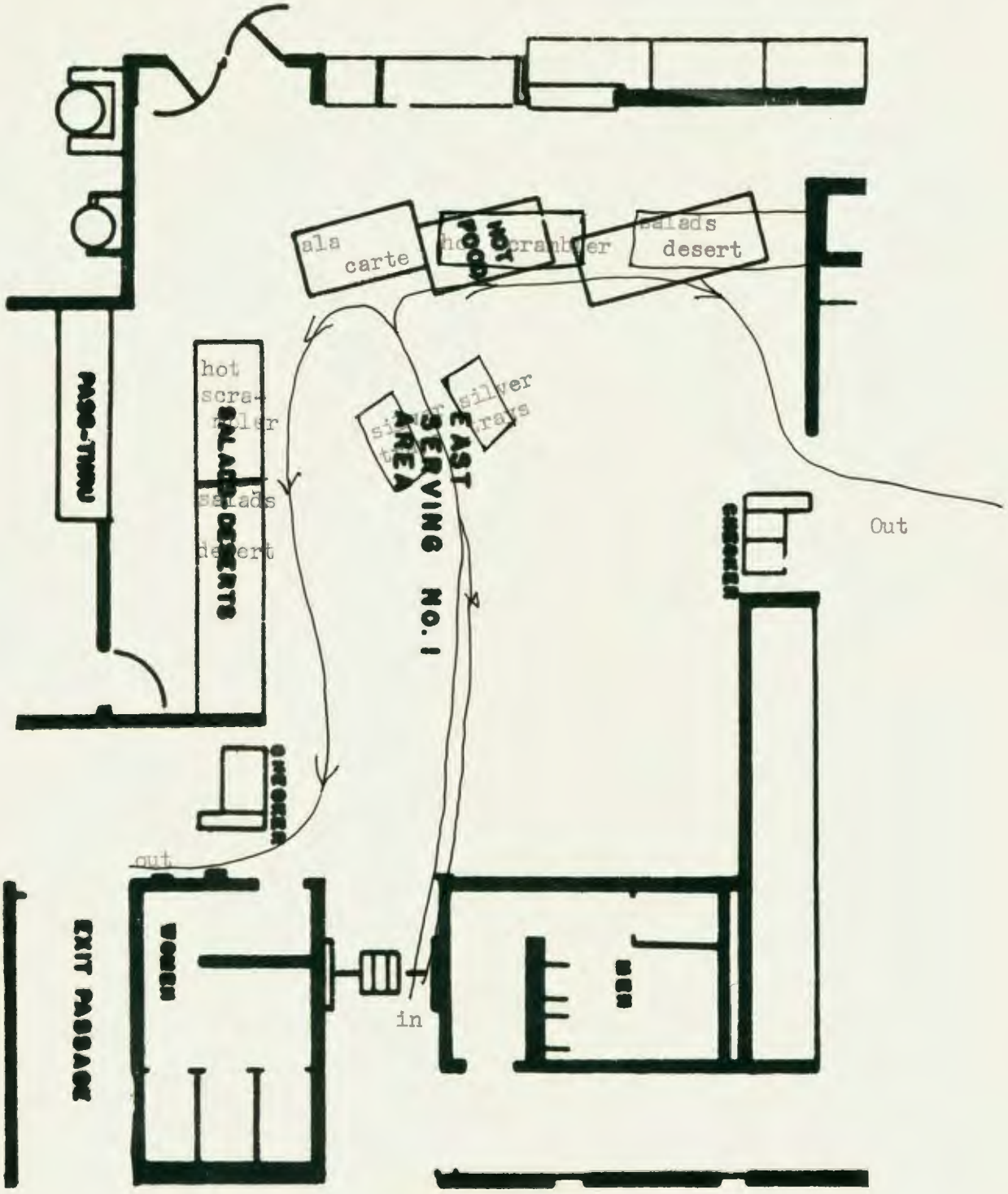


Figure B

"SCAT-A-PAT" -- West Holmes

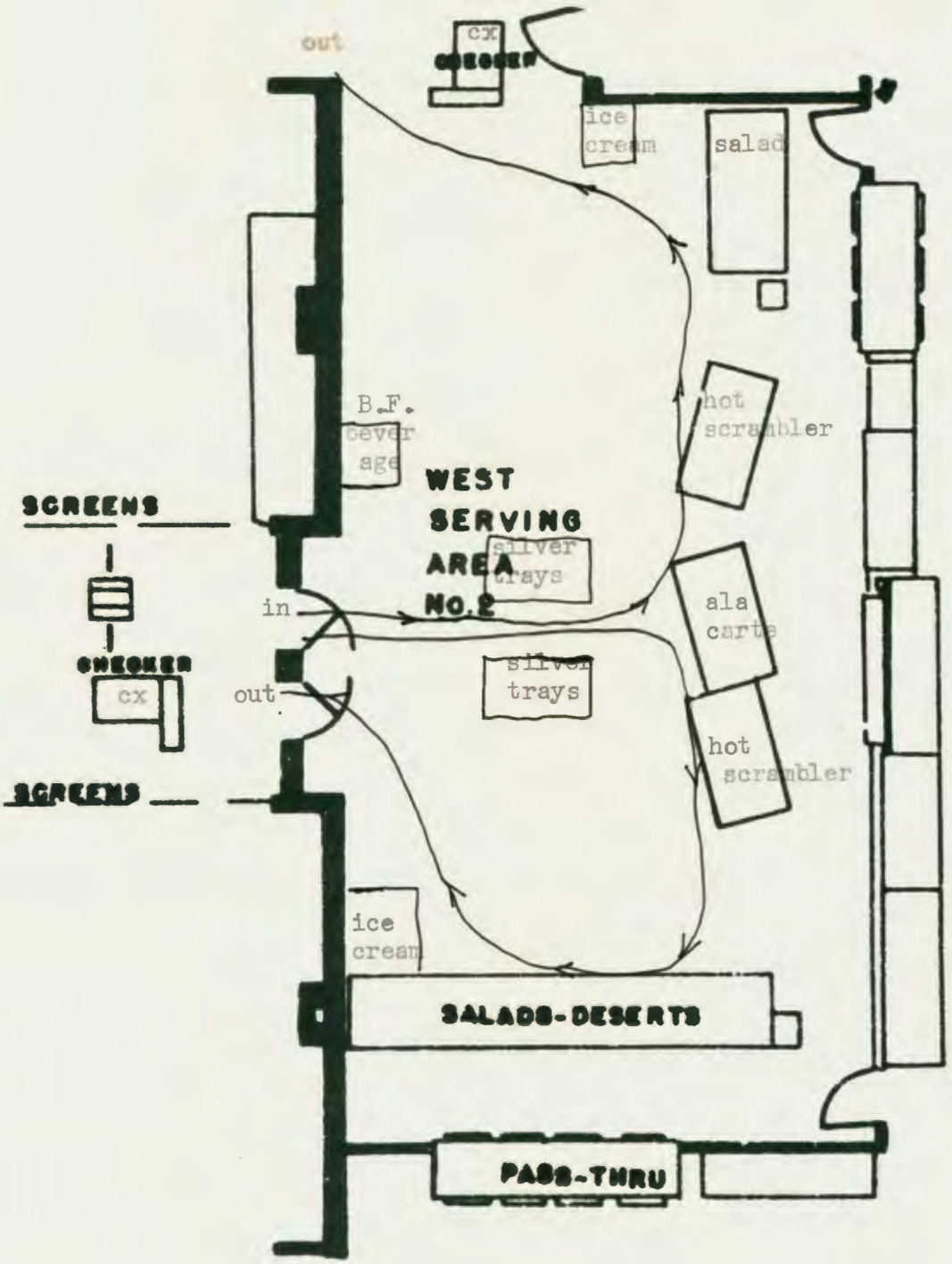
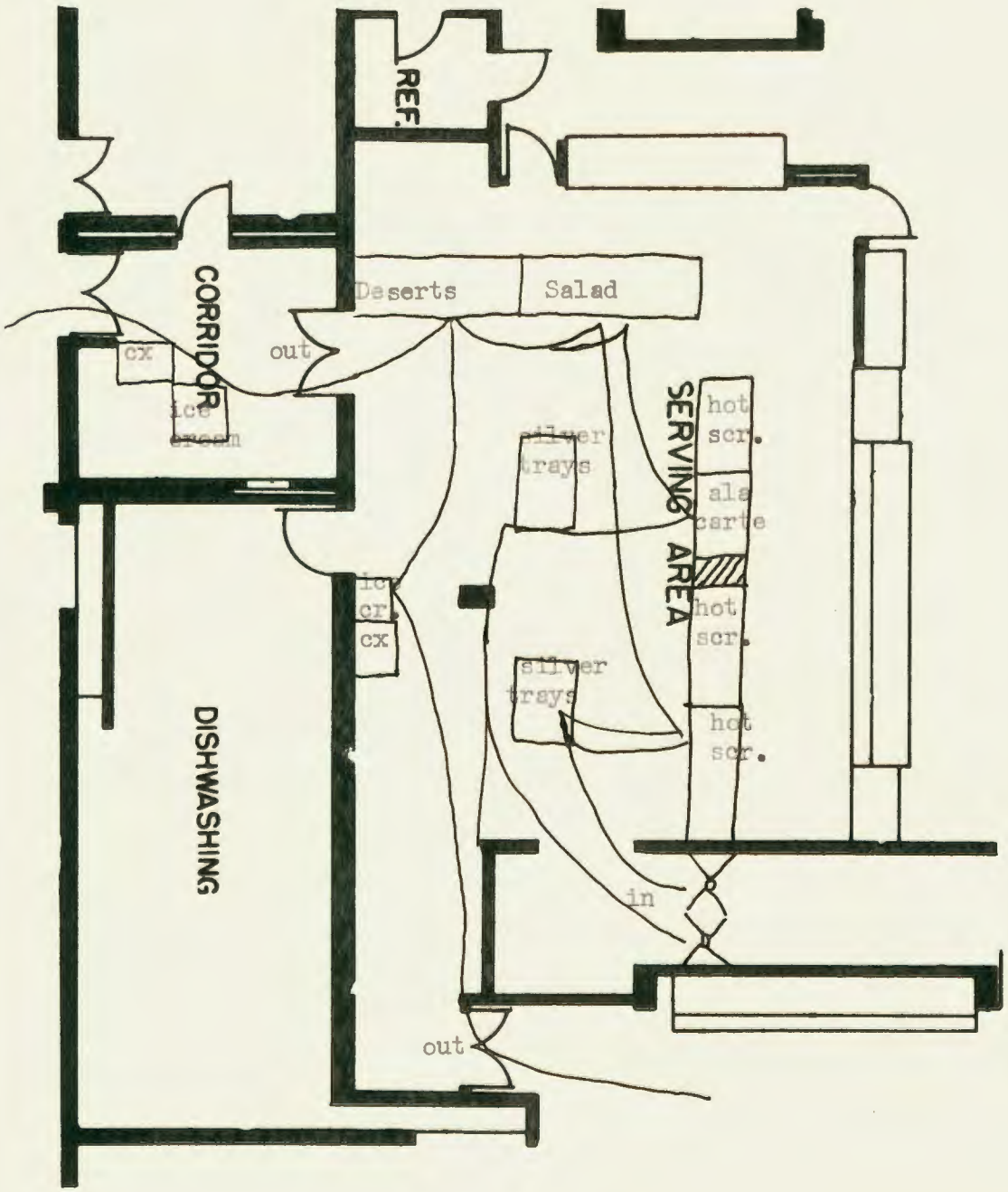


Figure C

"SCAT-A-PAT" -- Commons



BIBLIOGRAPHY

BIBLIOGRAPHY

Chartrand, Maurice, "The Design of Cafeteria Counters," Institutions Magazine, Vol. 43:122-125, July, 1958.

Dukas, Peter, "How to Analyze Food Service Capacity," Institutions, Vol. 38:18-21, May, 1956.

Johnson, Alice, "Upper Campus Picketers Protest Food," Campus Crier, Vol. 41, No. 13, January 26, 1968.

Kazarian, Edward A., "Graphic Method Analyzes Cafeteria Operation, College and University Business, Vol. 37, No. 6, December, 1964.

Schneider, N., and John, E., Commercial Kitchens, American Gas Association, New York, New York, 1962, 258 pp.

APPENDIX

A

TABLE 1

DAILY ANALYSIS OF DINING AND SERVING FACILITIES AT COMMONS

A La Carte -- May 5

Time	Serving Time per person in seconds	Number of People in Line	Serving Line Rate	Dining Time per person in minutes	Number of People in Dining Room
11:15	180	0	0	22.00	0
11:20	60	2	11	23.00	39
11:25	35	3	7	14.25	112
11:30	90	2	9	14.30	149
11:35	25	2	4	14.35	171
11:40	35	--	7	14.25	167
11:45	45	--	3	20.15	141
11:50	15	--	8	10.45	124
11:55	105	2	10	22.45	112
12:00	100	1	12	43.50	134
12:05	40	--	7	12.20	174
12:10	45	--	6	17.10	198
12:15	45	--	2	13.15	185
Total	760	12	86	243	1,822
Average	58	1	7.1	18.7	140

TABLE 2

DAILY ANALYSIS OF DINING AND SERVING FACILITIES AT COMMONS

Scramble -- May 5

Time	Serving Time per person in seconds	Number of People in Line	Serving Line Rate	Dining Time per person in minutes	Number of People in Dining Room
11:15	95	10	0	21.45	0
11:20	35	15	39	18.25	39
11:25	35	4	57	14.25	112
11:30	30	1	52	15.30	149
11:35	15	5	29	17.25	179
11:40	15	--	31	9.45	167
11:45	60	4	29	8.00	141
11:50	35	--	33	15.25	128
11:55	95	--	29	28.45	112
12:00	40	6	42	39.20	134
12:05	50	--	52	17.10	175
12:10	40	1	49	20.20	198
12:15	45	2	29	19.15	185
Total	590	48	461	243	1,822
Average	46	38	35	18.1	140

TABLE 3

DAILY ANALYSIS OF DINING AND SERVING FACILITIES AT COMMONS

A La Carte -- May 6

Time	Serving Time per person in seconds	Number of People in Line	Serving Line Rate	Dining Time per person in minutes	Number of People in Dining Room
11:15	20	4	0	18.40	0
11:20	50	5	15	34.10	70
11:25	155	--	15	14.25	123
11:30	280	4	4	10.00	159
11:35	25	4	11	17.35	158
11:40	270	4	4	17.30	159
11:45	170	2	4	32.10	141
11:50	195	3	17	18.45	124
11:55	285	3	10	23.15	125
12:00	230	5	8	14.10	171
12:05	90	3	12	10.30	210
12:10	175	4	7	19.05	240
12:15	60	--	--	16.00	242
Total	2,005	41	97	263	1,922
Average	154	33	8	20.2	160

TABLE 4

DAILY ANALYSIS OF DINING AND SERVING FACILITIES AT COMMONS

Scramble -- May 6

Time	Serving Time per person in seconds	Number of People in Line	Serving Line Rate	Dining Time per person in minutes	Number of People in Dining Room
11:15	120	9	0	16.00	0
11:20	120	12	66	22.00	70
11:25	40	2	59	19.20	123
11:30	50	8	45	14.10	159
11:35	45	4	23	12.15	158
11:40	25	1	37	26.35	159
11:45	15	2	15	11.45	141
11:50	100	15	28	38.50	124
11:55	50	3	31	19.10	125
12:00	90	12	54	22.30	171
12:05	150	10	48	22.30	210
12:10	55	7	50	22.05	240
12:15	50	8	29	19.10	242
Total	910	93	48.5	266	1,922
Average	70	7.3	40.4	20.5	160

TABLE 5

DAILY ANALYSIS OF DINING AND SERVING FACILITIES AT COMMONS

A La Carte -- May 7

Time	Serving Time per person in seconds	Number of People in Line	Serving Line Rate	Dining Time per person in minutes	Number of People in Dining Room
11:15	90	6	0	20.30	0
11:20	90	5	12	24.30	69
11:25	210	2	2	20.30	71
11:30	195	1	1	23.45	106
11:35	210	1	8	18.30	132
11:40	180	2	10	11.30	129
11:45	180	2	5	12.00	111
11:50	180	1	12	14.00	107
11:55	130	2	8	20.30	96
12:00	210	2	4	15.30	150
12:05	195	2	4	19.45	204
12:10	105	1	6	15.15	212
12:15	135	--	--	22.45	210
Total	2,070	27	72	239	1,597
Average	159	2	6	18.6	133

TABLE 6

DAILY ANALYSIS OF DINING AND SERVING FACILITIES AT COMMONS

Scramble -- May 7

Time	Serving Time per person in seconds	Number of People in Line	Serving Line Rate	Dining Time per person in minutes	Number of People in Dining Room
11:15	60	0	0	18.00	0
11:20	35	8	57	19.25	69
11:25	35	10	63	58.25	71
11:30	20	4	31	13.40	106
11:35	20	2	41	11.40	132
11:40	25	4	23	14.35	129
11:45	80	8	30	31.40	111
11:50	20	2	14	46.40	107
11:55	20	7	31	9.40	96
12:00	55	20	71	14.05	150
12:05	25	6	57	14.35	204
12:10	50	3	21	13.10	212
12:15	20	1	27	14.40	210
Total	465	84	466	280	1,597
Average	36	6.4	35.8	21.5	133

TABLE 7

DAILY ANALYSIS OF DINING AND SERVING FACILITIES AT COMMONS

A La Carte -- May 8

Time	Serving Time per person in seconds	Number of People in Line	Serving Line Rate	Dining Time per person in minutes	Number of People in Dining Room
11:15	75	6	0	26.45	0
11:20	145	1	2	17.35	55
11:25	120	4	5	31.00	86
11:30	125	1	6	17.55	135
11:35	210	1	10	16.30	170
11:40	55	1	5	26.05	194
11:45	195	1	3	28.45	178
11:50	135	1	6	31.45	148
11:55	140	1	9	23.40	161
12:00	120	1	6	12.00	180
12:05	--	--	3	--	219
12:10	255	5	9	21.05	213
12:15	260	2	8	9.40	197
Total	1,755	25	72	257.45	1,836
Average	135	2	6	20.2	153

TABLE 8

DAILY ANALYSIS OF DINING AND SERVING FACILITIES AT COMMONS

Scramble -- May 8

Time	Serving Time per person in seconds	Number of People in Line	Serving Line Rate	Dining Time per person in minutes	Number of People in Dining Room
11:15	50	15	0	22.10	0
11:20	45	7	45	19.15	55
11:25	30	4	32	29.30	86
11:30	40	8	46	31.10	135
11:35	20	5	31	23.40	170
11:40	45	2	29	6.15	194
11:45	60	5	23	44.00	178
11:50	50	1	31	30.10	148
11:55	40	22	46	17.20	161
12:00	50	13	53	19.10	180
12:05	30	--	52	14.30	219
12:10	20	--	31	9.40	213
12:15	40	3	18	17.20	197
Total	520	85	437	284	1,936
Average	40	6.5	4	21	161

TABLE 9

DAILY ANALYSIS OF DINING AND SERVING FACILITIES AT COMMONS

A La Carte -- May 9

Time	Serving Time per person in seconds	Number of People in Line	Serving Line Rate	Dining Time per person in minutes	Number of People in Dining Room
11:15	180	7	0	14.00	0
11:20	300	10	7	26.55	51
11:25	210	5	10	19.30	86
11:30	215	6	6	16.25	114
11:35	280	8	7	18.20	140
11:40	165	4	5	20.15	148
11:45	210	2	5	28.30	114
11:50	270	2	2	39.30	90
11:55	210	7	6	33.30	90
12:00	245	10	5	10.55	129
12:05	390	9	10	18.30	141
12:10	240	5	10	11.00	153
12:15	235	1	3	14.05	175
Total	3,270	76	76	270	1,431
Average	252	5.8	6.3	20.7	119

TABLE 10

DAILY ANALYSIS OF DINING AND SERVING FACILITIES AT COMMONS

Scramble -- May 9

Time	Serving Time per person in seconds	Number of People in Line	Serving Line Rate	Dining Time per person in minutes	Number of People in Dining Room
11:15	25	10	0	13.35	0
11:20	20	6	44	23.40	51
11:25	45	5	29	29.15	86
11:30	20	1	30	19.05	114
11:35	40	6	42	14.20	140
11:40	25	1	33	5.35	148
11:45	25	3	33	39.35	114
11:50	15	2	18	45.45	90
11:55	20	5	21	14.40	90
12:00	75	9	51	11.45	129
12:05	40	1	26	18.20	141
12:10	50	5	33	27.10	153
12:15	35	1	19	13.25	175
Total	435	55	379	276	1,431
Average	33.4	4.2	31.5	21.2	119

TABLE 11

DAILY ANALYSIS OF DINING AND SERVING FACILITIES AT EAST HOLMES

A La Carte -- May 12

Time	Serving Time per person in seconds	Number of People in Line	Serving Line Rate	Dining Time per person in minutes	Number of People in Dining Room
11:15	180	2	0	27.00	42
11:20	255	--	1	28.05	80
11:25	--	--	1	--	142
11:30	240	1	2	27.00	129
11:35	--	--	--	--	128
11:40	--	--	--	--	122
11:45	--	--	--	--	58
11:50	190	2	2	22.50	40
11:55	--	--	6	--	53
12:00	--	--	--	--	99
12:05	--	--	4	--	144
12:10	130	1	3	19.50	152
12:15	--	--	3	--	160
Total	915	6	22	125	1,349
Average	183	1.5	2.8	25	104

TABLE 12

DAILY ANALYSIS OF DINING AND SERVING FACILITIES AT EAST HOLMES

Scramble -- May 12

Time	Serving Time per person in seconds	Number of People in Line	Serving Line Rate	Dining Time per person in minutes	Number of People in Dining Room
11:15	190	15	0	18.50	42
11:20	25	17	44	24.35	80
11:25	50	11	47	22.10	142
11:30	50	11	31	24.10	129
11:35	15	--	42	17.45	128
11:40	20	4	16	18.40	122
11:45	25	--	12	8.35	58
11:50	30	9	15	21.30	40
11:55	45	3	36	31.15	53
12:00	25	8	45	19.35	99
12:05	70	25	38	11.50	144
12:10	175	25	44	12.05	152
12:15	55	2	35	18.05	160
Total	715	130	405	249.05	1,349
Average	55	10	33.7	17.7	104

TABLE 13

DAILY ANALYSIS OF DINING AND SERVING FACILITIES AT WEST HOLMES

A La Carte -- May 12

Time	Serving Time per person in seconds	Number of People in Line	Serving Line Rate	Dining Time per person in minutes	Number of People in Dining Room
11:15	90	2	0	15.30	0
11:20	45	6	2	14.15	35
11:25	140	1	5	21.40	99
11:30	150	2	4	19.30	166
11:35	100	2	5	20.30	175
11:40	--	--	4	--	131
11:45	290	1	3	12.10	97
11:50	--	--	--	--	59
11:55	270	6	8	27.30	44
12:00	90	4	5	30.30	97
12:05	60	1	2	9.00	135
12:10	225	2	3	22.15	156
12:15	195	1	2	12.40	171
Total	1,595	28	43	205.20	1,365
Average	145	2.8	4	18.7	113

TABLE 14

DAILY ANALYSIS OF DINING AND SERVING FACILITIES AT WEST HOLMES

Scramble -- May 12

Time	Serving Time per person in seconds	Number of People in Line	Serving Line Rate	Dining Time per person in minutes	Number of People in Dining Room
11:15	75	15	--	37.45	0
11:20	75	15	33	25.45	35
11:25	45	7	59	11.15	99
11:30	1	7	64	12.00	166
11:35	135	1	22	33.45	175
11:40	60	--	19	17.00	131
11:45	75	2	23	23.45	97
11:50	45	2	15	16.15	59
11:55	60	9	5	15.00	44
12:00	75	23	63	23.45	97
12:05	105	10	48	32.15	135
12:10	180	12	38	7.00	156
12:15	45	2	51	19.15	171
Total	1,035	105	440	274	1,365
Average	79.5	8.8	36.6	21.1	113

TABLE 15

DAILY ANALYSIS OF DINING AND SERVING FACILITIES AT EAST HOLMES

A La Carte -- May 13

Time	Serving Time per person in seconds	Number of People in Line	Serving Line Rate	Dining Time per person in minutes	Number of People in Dining Room
11:15	480	8	0	68.00	0
11:20	420	7	11	23.00	63
11:25	240	8	15	27.00	97
11:30	420	10	9	18.00	124
11:35	360	5	9	24.00	122
11:40	450	5	11	26.30	125
11:45	130	6	9	49.50	160
11:50	--	--	2	--	135
11:55	9	3	6	21.00	151
12:00	70	7	14	29.50	181
12:05	--	--	10	--	212
12:10	250	4	7	7.50	214
12:15	105	5	5	10.15	184
Total	3,705	68	108	368.15	1,768
Average	337	6.1	9	33.4	147

TABLE 16

DAILY ANALYSIS OF DINING AND SERVING FACILITIES AT EAST HOLMES

Scramble -- May 13

Time	Serving Time per person in seconds	Number of People in line	Serving Line Rate	Dining Time per person in minutes	Number of People in Dining Room
11:15	30	26	0	20.30	0
11:20	65	30	40	59.35	63
11:25	90	11	50	13.50	97
11:30	130	15	52	10.50	124
11:35	25	6	35	59.35	122
11:40	55	4	43	23.05	125
11:45	20	4	35	9.40	160
11:50	50	11	31	25.10	135
11:55	55	6	54	17.15	151
12:00	75	9	56	24.45	181
12:05	65	17	54	11.55	212
12:10	190	8	52	32.50	214
12:15	45	3	27	20.15	184
Total	875	150	529	331.05	1,768
Average	67	11.5	44	25.4	147

TABLE 17

DAILY ANALYSIS OF DINING AND SERVING FACILITIES AT WEST HOLMES

A La Carte -- May 13

Time	Serving Time per person in seconds	Number of People in Line	Serving Line Rate	Dining Time per person in minutes	Number of People in Dining Room
11:15	255	3	0	39.45	0
11:20	270	2	7	20.30	46
11:25	360	10	10	19.00	103
11:30	330	5	15	34.30	161
11:35	480	5	5	22.00	181
11:40	180	4	3	33.00	165
11:45	540	4	4	13.00	137
11:50	300	6	10	27.00	117
11:55	210	2	5	17.30	106
12:00	240	7	6	10.00	126
12:05	230	5	7	11.10	159
12:10	210	4	5	34.30	166
12:15	--	--	4	--	150
Total	3,605	57	81	281.55	1,617
Average	300	4.7	7.5	23.5	134

TABLE 18

DAILY ANALYSIS OF DINING AND SERVING FACILITIES AT WEST HOLMES

Scramble -- May 13

Time	Serving Time per person in seconds	Number of People in Line	Serving Line Rate	Dining Time per person in minutes	Number of People in Dining Room
11:15	80	15	0	38.40	0
11:20	45	9	46	16.15	46
11:25	85	7	57	18.35	103
11:30	150	6	58	13.30	161
11:35	150	5	39	17.30	181
11:40	100	4	18	18.20	165
11:45	90	4	27	28.30	137
11:50	30	6	24	22.30	117
11:55	50	7	23	24.10	106
12:00	115	7	57	27.05	126
12:05	45	3	56	24.15	159
12:10	90	5	39	18.30	160
12:15	45	--	25	14.15	150
Total	1,078	78	469	283	1,617
Average	83	6.5	39	21.8	134

TABLE 19

DAILY ANALYSIS OF DINING AND SERVING FACILITIES AT EAST HOLMES

A La Carte -- May 14

Time	Serving Time per person in seconds	Number of People in Line	Serving Line Rate	Dining Time per person in minutes	Number of People in Dining Room
11:15	165	5	0	25.15	0
11:20	135	4	8	23.15	61
11:25	540	4	13	32.20	113
11:30	310	8	5	21.50	159
11:35	430	5	8	36.30	180
11:40	--	--	1	--	187
11:45	--	--	--	--	144
11:50	--	--	--	--	113
11:55	370	2	5	20.50	111
12:00	160	6	8	24.20	133
12:05	105	3	6	27.15	163
12:10	135	2	8	47.45	172
12:15	--	--	3	--	187
Total	1,830	39	67	259.20	1,723
Average	203	4.4	6	28.8	144

TABLE 20

DAILY ANALYSIS OF DINING AND SERVING FACILITIES AT EAST HOLMES

Scramble -- May 14

Time	Serving Time per person in seconds	Number of People in Line	Serving Line Rate	Dining Time per person in minutes	Number of People in Dining Room
11:15	75	28	0	19.45	0
11:20	65	26	40	25.55	61
11:25	105	10	41	36.15	113
11:30	140	5	56	29.40	159
11:35	110	13	32	20.10	180
11:40	45	1	25	26.45	187
11:45	50	2	13	49.10	144
11:50	195	6	17	22.55	113
11:55	50	4	25	11.10	111
12:00	65	17	42	39.55	133
12:05	45	8	43	14.15	163
12:10	40	17	20	27.30	172
12:15	90	18	51	13.30	187
Total	1,085	155	405	336	1,723
Average	83	11.9	33.7	25.9	144

TABLE 21

DAILY ANALYSIS OF DINING AND SERVING FACILITIES AT WEST HOLMES

A La Carte -- May 14

Time	Serving Time per person in seconds	Number of People in Line	Serving Line Rate	Dining Time per person in minutes	Number of People in Dining Room
11:15	255	3	0	26.45	0
11:20	165	2	3	24.15	26
11:25	420	5	2	11.00	65
11:30	400	5	5	13.20	141
11:35	360	2	5	11.00	174
11:40	450	4	3	18.30	174
11:45	450	4	3	11.30	156
11:50	510	2	5	17.30	109
11:55	300	3	4	7.00	103
12:00	240	7	6	24.00	109
12:05	350	2	8	17.00	153
12:10	300	2	6	5.00	176
12:15	270	--	4	19.30	203
Total	4,520	41	54	206.20	1,792
Average	349	3.4	4.5	15.8	149

TABLE 22

DAILY ANALYSIS OF DINING AND SERVING FACILITIES AT WEST HOLMES

Scramble -- May 14

Time	Serving Time per person in seconds	Number of People in Line	Serving Line Rate	Dining Time per person in minutes	Number of People in Dining Room
11:15	75	12	0	23.45	0
11:20	90	12	31	11.45	26
11:25	60	6	51	24.00	65
11:30	70	12	46	8.50	141
11:35	100	4	38	15.20	174
11:40	120	2	44	25.00	174
11:45	135	1	16	20.45	156
11:50	75	2	13	8.45	109
11:55	60	2	22	11.00	103
12:00	80	10	41	23.40	109
12:05	45	4	39	24.10	153
12:10	45	5	44	21.15	176
12:15	45	1	22	29.45	203
Total	1,000	73	407	248.05	1,792
Average	77	5.6	34.9	19	149

TABLE 23

DAILY ANALYSIS OF DINING AND SERVING FACILITIES AT EAST HOLMES

A La Carte -- May 15

Time	Serving Time per person in seconds	Number of People in Line	Serving Line Rate	Dining Time per person in minutes	Number of People in Dining Room
11:15	310	4	0	5.50	31
11:20	160	4	4	47.20	48
11:25	--	--	7	--	90
11:30	135	7	2	13.45	131
11:35	345	5	9	47.15	148
11:40	195	6	8	36.45	159
11:45	140	1	5	31.40	158
11:50	160	3	6	27.20	166
11:55	95	4	7	15 25	168
12:00	--	--	5	--	169
12:05	170	4	5	31.10	168
12:10	--	--	10	--	197
12:15	--	--	6	--	203
Total	1,710	38	74	238	2,039
Average	190	4.2	6.1	26.5	157

TABLE 24

DAILY ANALYSIS OF DINING AND SERVING FACILITIES AT EAST HOLMES

Scramble -- May 15

Time	Serving Time per person in seconds	Number of People in Line	Serving Line Rate	Dining Time per person in minutes	Number of People in Dining Room
11:15	75	27	0	23.45	31
11:20	55	12	42	14.05	48
11:25	55	17	37	22.05	90
11:30	50	13	53	24.10	131
11:35	45	7	52	24.15	148
11:40	65	12	45	47.55	159
11:45	55	16	29	26.05	158
11:50	--	10	53	23.00	166
11:55	120	13	41	44.00	168
12:00	85	12	24	20.35	169
12:05	85	13	38	13.35	168
12:10	55	7	10	23.05	197
12:15	50	3	37	15.10	203
Total	915	162	461	320	2,039
Average	70	12.4	38.4	24.7	157

TABLE 25

DAILY ANALYSIS OF DINING AND SERVING FACILITIES AT WEST HOLMES

A La Carte -- May 15

Time	Serving Time per person in seconds	Number of People in Line	Serving Line Rate	Dining Time per person in Minutes	Number of People in Dining Room
11:15	240	3	0	25.00	0
11:20	--	--	2	--	14
11:25	270	3	3	--	68
11:30	--	--	7	--	116
11:35	260	1	4	11.40	156
11:40	330	1	5	8.30	187
11:45	--	--	2	--	172
11:50	195	--	1	32.45	130
11:55	330	3	4	31.30	111
12:00	210	2	5	34.30	113
12:05	210	1	5	12.30	152
12:10	165	--	7	14.15	180
12:15	240	--	1	15.00	193
Total	2,450	14	46	210	1,592
Average	245	2	3.8	21.1	132

TABLE 26

DAILY ANALYSIS OF DINING AND SERVING FACILITIES AT WEST HOLMES

Scramble -- May 15

Time	Serving Time per person in seconds	Number of People in Line	Serving Line Rate	Dining Time per person in minutes	Number of People in Dining Room
11:15	120	9	0	20.00	0
11:20	45	20	12	14.12	14
11:25	90	14	51	19.30	68
11:30	90	3	44	18.30	116
11:35	90	6	46	13.30	156
11:40	45	16	39	11.15	187
11:45	75	3	35	6.45	172
11:50	45	2	19	9.15	130
11:55	120	10	17	20.00	111
12:00	75	16	38	32.45	113
12:05	130	20	45	30.50	152
12:10	75	14	33	23.45	180
12:15	105	12	33	18.15	193
Total	1,105	138	412	238	1,592
Average	87	10.6	34.3	18.4	132.5

TABLE 27

DAILY ANALYSIS OF DINING AND SERVING FACILITIES AT EAST HOLMES

A La Carte -- May 16

Time	Serving Time per person in seconds	Number of People in Line	Serving Line Rate	Dining Time per person in minutes	Number of People in Dining Room
11:15	--	--	--	--	46
11:20	450	7	10	19.30	84
11:25	455	10	15	21.25	131
11:30	190	8	3	24.50	143
11:35	300	1	7	20.00	170
11:40	240	1	3	32.00	150
11:45	310	4	3	15.50	109
11:50	660	6	6	13.00	82
11:55	485	8	9	40.55	89
12:00	95	7	8	21.45	123
12:05	--	--	8	--	151
12:10	315	8	5	11.45	182
12:15	--	--	9	--	184
Total	3,660	60	87	221	1,644
Average	366	6	7.1	22.1	126

TABLE 28

DAILY ANALYSIS OF DINING AND SERVING FACILITIES AT EAST HOLMES

Scramble -- May 16

Time	Serving Time per person in seconds	Number of People in Line	Serving Line Rate	Dining Time per person in minutes	Number of People in Dining Room
11:15	85	6	0	17.35	46
11:20	45	7	26	26.15	84
11:25	55	3	36	12.55	131
11:30	45	13	23	22.15	143
11:35	50	8	39	20.10	170
11:40	40	--	18	32.20	150
11:45	105	3	11	27.50	109
11:50	70	7	21	41.50	82
11:55	35	6	19	17.25	89
12:00	55	15	41	17.05	123
12:05	35	21	29	35.25	151
12:10	40	11	43	24.20	182
12:15	25	6	41	12.35	184
Total	685	106	366	308	1,644
Average	53	8	30.5	23.7	126

TABLE 29

DAILY ANALYSIS OF DINING AND SERVING FACILITIES AT WEST HOLMES

A La Carte -- May 16

Time	Serving Time per person in seconds	Number of People in Line	Serving Line Rate	Dining Time per person in minutes	Number of People in Dining Room
11:15	510	1	0	19.30	0
11:20	480	9	2	19.00	31
11:25	450	9	5	11.30	99
11:30	510	1	7	12.30	141
11:35	410	2	2	22.10	153
11:40	250	3	2	8.45	130
11:45	300	4	3	15.00	112
11:50	420	2	5	29.00	86
11:55	180	1	2	45.00	89
12:00	240	7	4	19.00	110
12:05	210	3	6	20.30	110
12:10	330	3	4	17.30	133
12:15	210	2	5	12.30	133
Total	4,500	47	47	252	1,327
Average	344	3.6	3.6	19.3	110.5

TABLE 30

DAILY ANALYSIS OF DINING AND SERVICE FACILITIES AT WEST HOLMES

Scramble -- May 16

Time	Serving Time per person in seconds	Number of People in Line	Serving Line Rate	Dining Time per person in minutes	Number of People in Dining Room
11:15	60	18	0	25	0
11:20	50	16	22	18.10	31
11:25	50	12	59	16.10	99
11:30	50	14	43	14.10	141
11:35	50	8	32	20.25	153
11:40	75	7	21	25.45	130
11:45	45	3	11	39.15	112
11:50	50	4	17	34.10	86
11:55	50	10	21	6.10	89
12:00	60	8	33	26.00	110
12:05	90	4	32	24.30	110
12:10	60	8	42	17.00	133
12:15	45	2	26	17.15	133
Total	735	114	359	284	1,327
Average	56.5	8.7	30	21.8	110.5

TABLE 31

COMMONS
SUMMARY OF DAILY ANALYSIS OF THE A LA CARTE SYSTEM

Date	Serving Time per person in seconds	Number of People in Line	Serving Line Rate	Dining Time per person in minutes	Number of People in Dining Room
5/5	58	1	7.1	18.7	140
5/6	154	3.3	8	20.2	160
5/7	159	2	6	18.6	133
5/8	135	2	6	20.2	153
5/9	252	5.8	6.3	20.7	119
Total of Week	758	14.1	33.4	96.24	705
Daily Average	152	2.8	6.7	19.3	141

TABLE 32

COMMONS
SUMMARY OF DAILY ANALYSIS OF SCRAMBLE SYSTEM

Date	Serving Time per person in seconds	Number of People in Line	Serving Line Rate	Dining Time per person in minutes	Number of People in Dining Room
5/5	56	3.8	35	18.1	140
5/6	68	7.3	40.4	20.5	160
5/7	36	6.4	35.8	21.5	133
5/8	40	6.5	36.4	21	161
5/9	33	4.2	31.5	21.5	119
Total of Week	233	28.2	179.1	101.13	713
Daily Average	47	5.6	36	20.5	143

TABLE 33

EAST HOLMES
SUMMARY OF DAILY ANALYSIS OF THE A LA CARTE SYSTEM

Date	Serving Time per person in seconds	Number of People in Line	Serving Line Rate	Dining Time per person in minutes	Number of People in Dining Room
5/12	183	1.5	2.8	25	104
5/13	337	6.1	9	33.4	147
5/14	203	4.4	6	28.8	144
5/15	190	4.2	6.1	26.5	157
5/16	336	6	7.1	22.1	126
Total of Week	1,279	22.2	31.00	135.8	678
Daily Average	256	4.4	6.2	27	136

TABLE 34

EAST HOLMES
SUMMARY OF DAILY ANALYSIS OF THE SCRAMBLE SYSTEM

Date	Serving Time per person in seconds	Number of People in Line	Serving Line Rate	Dining Time per person in minutes	Number of People in Dining Room
5/12	55	10	33.7	17.7	104
5/13	67	11.5	44	25.4	147
5/14	83	11.9	33.7	25.9	144
5/15	70	12.4	38.4	24.7	157
5/16	53	8	30.5	23.7	126
Total of Week	328	538	180.3	117.4	678
Daily Average	66	10.7	36	23.5	136

TABLE 35

WEST HOLMES
SUMMARY OF DAILY ANALYSIS OF THE A LA CARTE SYSTEM

Date	Serving Time per person in seconds	Number of People in Line	Serving Line Rate	Dining Time per person in minutes	Number of People in Dining Room
5/12	145	2.8	4	18.7	113
5/13	300	4.7	7.5	23.5	134
5/14	349	3.4	4.5	15.8	149
5/15	245	2	3.8	21.1	132.5
5/16	344	3.6	3.6	19.3	110.5
Total of Week	1,383	16.5	23.4	98.4	639
Daily Average	277	3.3	4.7	19.7	128

TABLE 36

WEST HOLMES
SUMMARY OF DAILY ANALYSIS OF THE SCRAMBLE SYSTEM

Date	Serving Time per person in seconds	Number of People in Line	Serving Line Rate	Dining Time per person in minutes	Number of People in Dining Room
5/12	79.5	8.8	36.6	21.1	113
5/13	83	6.5	39	21.8	134
5/14	77	5.6	34.9	19	149
5/15	87	10.6	34.3	18.4	132.5
5/16	56.5	8.7	30	21.8	110.5
Total of Week	383	40.2	174.8	102.1	639
Daily Average	77	8	35	20.4	128

TABLE 37

EAST HOLMES, WEST HOLMES, AND COMMONS

COMPARATIVE ANALYSIS OF THE A LA CARTE SYSTEM

Place and Date	Serving Time per person in seconds	Number of People in Line	Serving Line Rate	Dining Time per person in minutes	Number of people in Dining Room
East Holmes (Week of May 12-16)	256	4.4	6.2	27	136
West Holmes (Week of May 12-16)	276	3.3	4.7	19.7	128
Commons (Week of May 5-9)	152	2.8	6.7	19.3	143
Total	680	10.5	17.6	66	407
Institutional Average	227	3.5	5.9	22	136

TABLE 38

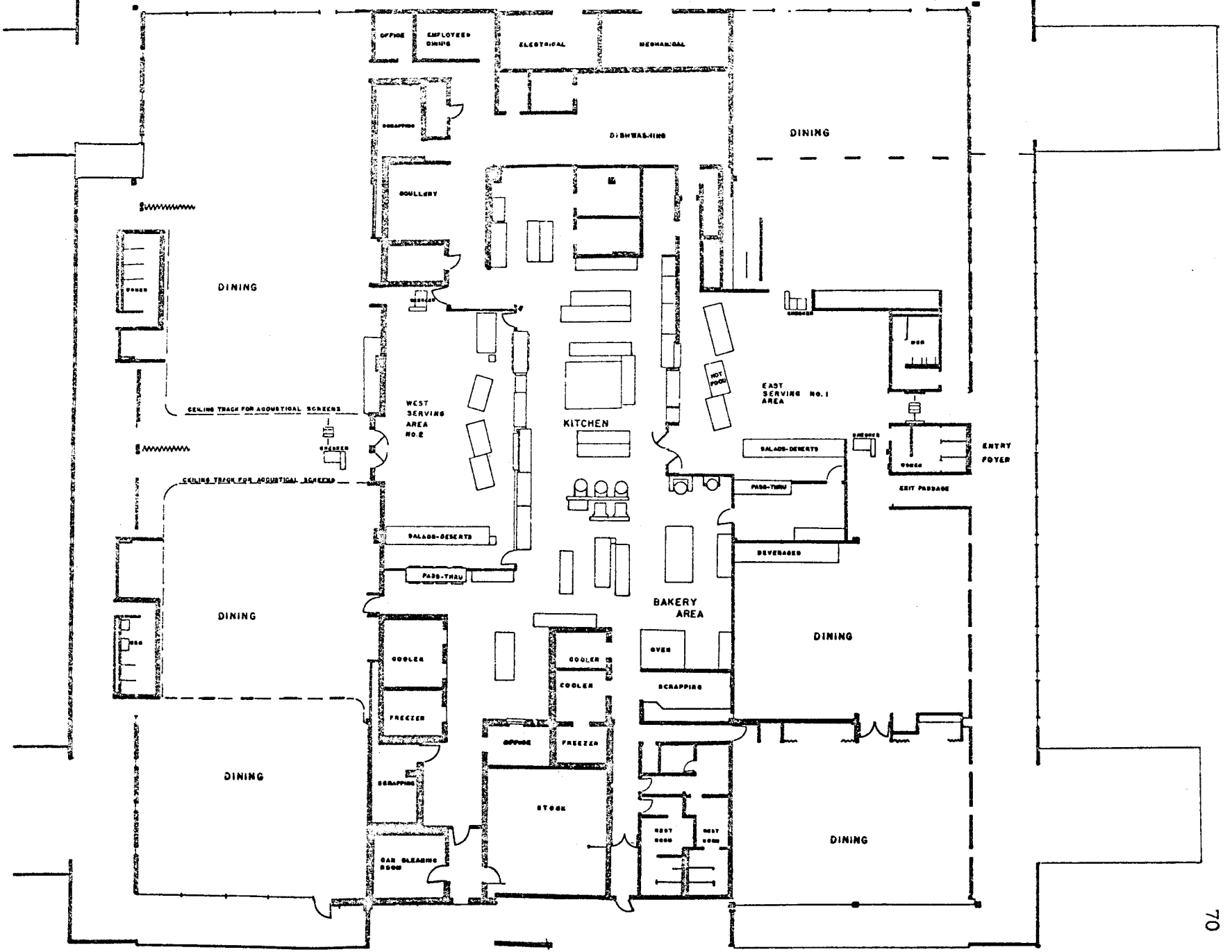
EAST HOLMES, WEST HOLMES, AND COMMONS

COMPARATIVE ANALYSIS OF THE SCRAMBLE SYSTEM

Place and Date	Serving Time per person in seconds	Number of People in Line	Serving Line Rate	Dining Time per person in minutes	Number of People in Dining Room
East Holmes (Week of May 12-16)	66	10.7	36	23.5	136
West Holmes (Week of May 12-16)	77	8	35	20.4	128
Commons (Week of May 5-9)	47	5.6	36	20.5	143
Total	188.8	24.3	107	64.4	407
Institutional Average	63	8.1	35.3	21.4	136

APPENDIX

B



HOLMES DINING HALL

East Holmes Dining Hall is the east wing of the Holmes complex, connected to a central kitchen.

The serving facility consists of:

2 electrically controlled gates

1 wide open entrance

2 portable tray and silver stands

1 ice cream cabinet

3 salad and dessert counters

1 five hot well a la carte counter

2 five hot well scramble counters

2 food check stands

1 beverage station

The dining facility consists of:

Total seating capacity of 450

2 dish tray deposit belts

2 condiment and beverage stations

2 exits

2 stations for seconds

West Holmes Dining Hall is the west wing of the Holmes complex, connected to a central kitchen.

The serving facility consists of:

2 electrically controlled gates

1 narrow entrance

2 portable tray and wilver stands

1 ice cream cabinet

2 salad and dessert counters

2 five hot well scramble counters

1 a la carte six-well counter

2 food check stands

The dining facility consists of

Total seating capacity of 500

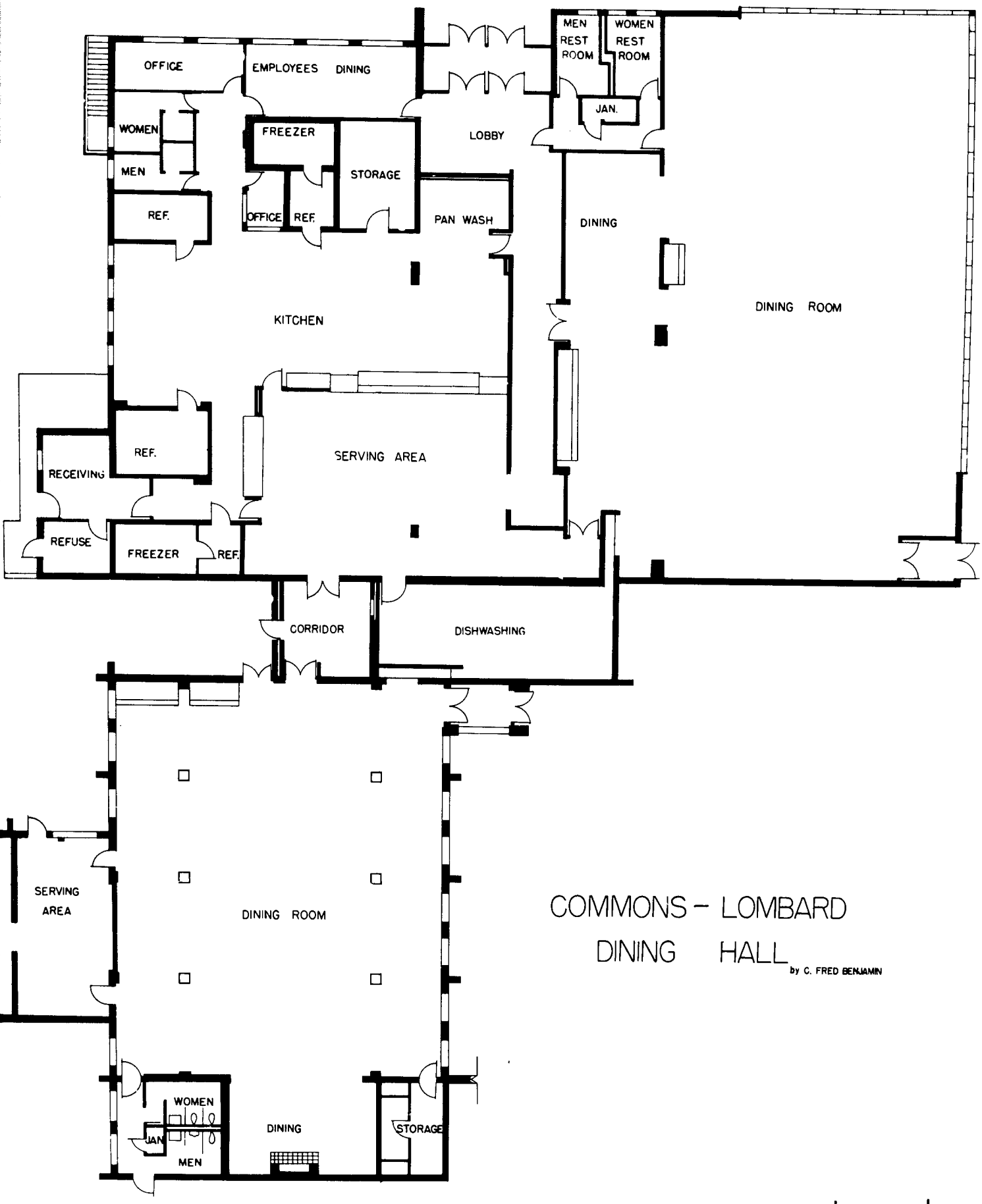
2 condiment and beverage stations

2 exits

2 stations for seconds

2 tray deposit belts

2 narrow entrances to dining facilities



COMMONS – LOMBARD DINING HALL

by C. FRED BENJAMIN

Commons Dining Hall is located in the Commons Building with its own kitchen.

The serving facility consists of:

2 electrically controlled gates

1 wide open entrance

2 portable tray and silver stands

2 ice cream cabinets

1 five hot well a la carte counter

3 scramble stations

2 salad and dessert stations

2 food check stands

1 beverage station

The dining facility consists of:

Total seating capacity of 550

2 tray deposit belts

2 condiment and beverage stations

2 seconds stations

2 exits

2 wide entrances to dining facilities

MICHIGAN STATE UNIVERSITY EAST LANSING • MICHIGAN 48823

GRADUATE SCHOOL OF BUSINESS ADMINISTRATION
DEPARTMENT OF MARKETING AND TRANSPORTATION ADMINISTRATION • EPPLEY CENTER

18 April 1969

Mr. A. K. Hoch
[redacted]

Dear Mr. Hoch:

I am sorry that I have not done any further work on cafeteria analysis.

I might point out at this time that the equation given in my article is mis-printed. The equation should read:

$$S = \left(\frac{M}{\frac{L}{t} - 1} \right) d$$

Best of luck on your project.

Sincerely,

Edward A. Kazarian
Associate Professor

EAK:eam

Please note:
Signature has been redacted due to security concerns.

MICHIGAN STATE UNIVERSITY EAST LANSING · MICHIGAN 48823

COLLEGE OF BUSINESS

SCHOOL OF HOTEL, RESTAURANT & INSTITUTIONAL MANAGEMENT · EPPLEY CENTER

13 May 1969

Adolf K. Hoch
[redacted]

Dear Mr. Hoch:

In reply to your questions regarding my cafeteria study; both Wilson and Owen Halls had conventional cafeteria lines at the time the study was done. Both dorms have now gone to a scramble system to speed service.

The only references that I am aware of on this subject matter are:

Chartrand, Maurice, "The Design of Cafeteria Counters", Institutions Magazine, Vol. 43: 122-125, July 1958.

Dukas, Peter, "How to Analyze Food Service Capacity", Institutions Vol 38: 18-21 May 1956.

Schneider, N. and John, E., Commercial Kitchens, American Gas Association, New York, New York 1962, 258 pp.

I hope this information is helpful to you.

Sincerely,

E.A. Kazarian
Associate Professor

EAK:brw

Please note:
Signature has been redacted due to security concerns.

CENTRAL WASHINGTON STATE COLLEGE

Graduate Division

Final Examination of

Adolf K. Hoch

B. S., Pacific Union College

1960

for the degree of

Master of Education

Committee in Charge

Dr. Luther Baker

Dr. Robert Smawley Miss Myrtle Carlson

Mitchell Hall

Business Conference Room

Thursday, June 19, 1969

3:00 p.m.

Courses Included in Graduate Study

Required Courses

Education	507	Introduction to Graduate Study
Education	570	Educational Foundations
Education	600	Thesis
Psychology	552	

Courses in Field of Specialization

Home Ec.	385	Family Meal Planning
Home Ec.	391	Consumer Buying
Home Ec.	394	Modern Problems of the Family
Home Ec.	447	Nutrition of Society
Home Ec.	596	Teaching Experimental Foods

Courses Transferred from University of Washington

Home Ec.	472	Institutional Food Purchasing
Home Ec.	576) 577) 578)	Supervised Field Work

Additional Courses of Graduate Work at University of Washington

20 more hours in the Department of Institutional Management

Elective Courses

Math.	171.1	Calculus
Home Ec.	597	Computer Programming

BIOGRAPHICAL INFORMATION

Born: [redacted]

Undergraduate Study

Walla Walla College, 1954-1955
General Courses
Pacific Union College, 1956, 1957; Summer, 1957; Winter and Spring, 1957-58; Fall and Spring, 1959-60
Extension Courses from San Diego State College, 1958-1959

Professional Experience:

Food Service Supervisor: Paradise Valley Hospital, National City, California, 1958-59
Food Consultant: U. S. D. A. Forest Service, Region #5, California; Summer and Fall, 1960
Administrative Dietetic Internship: University of Washington, 1961
Relief Dietitian: Northwest Memorial Hospital, Seattle, Washington, 1961
Assistant Manager, in charge of production: Boldts-Western, Seattle, 1962
Manager of Operations: S. S. Acapulco, World's Fair, 1962, Seattle, Washington
General Manager and President: Seattle and Vancouver, B.C. Supper Club, Inc., 1962-1964
Teacher: Highline School District, Evergreen High School, Food Service, 1964-65
Instructor: Seattle Community College in Advanced Catering and Buffet Work, 1964
Director of Food Services, and Teaching Food Service Supervision, Shoreline Community College, Seattle, 1965-66
Corporate Restaurant Manager: Meier and Frank Co., Portland, 1966
President and General Manager: Black Forest Inn, Inc., Yakima, Washington, 1967-68
Teacher: Yakima Valley College, teaching Quantity Food Production, Evening School, 1968-69
President and Manager: H & H Food Service, Yakima, Washington, 1968-

Certification:

Three-year certificate, Vocational Food Management and Production

Registration:

Registered Dietitian, American Dietetic Association