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FIELD FEEDING: BEHAVIORAL SCIENCES STUDIES

Herbert L. Meiselman, et al

Army Natick Development Center
Natick, Massachusetts

January 1975

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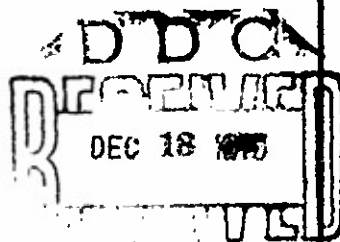
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TECHNICAL REPORT

76-3-FSL

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BEHAVIORAL SCIENCES STUDIES**

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January 1975

**UNITED STATES ARMY
NATICK DEVELOPMENT CENTER
NATICK, MASSACHUSETTS 01760**



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Technical Report

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FIELD FEEDING: BEHAVIORAL SCIENCES STUDIES

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January 1975

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EXECUTIVE SUMMARY

As part of the Operations Research and Systems Analysis study of Field Feeding for the Army and Marine Corps, a variety of Behavioral Sciences studies were undertaken dealing with consumer attitudes toward food and with the food service workers' view of field feeding. Survey and interview techniques were used, with a severe restriction that all materials should take five minutes or less to complete. All data were collected during military field training exercises for both services.

Food. Research on customer attitudes toward the food served in the field focused on what foods were wanted, and on the quantity of foods desired. The major conclusions were:

1. Meat items accounted for the majority of customer likes and dislikes.
2. Vegetable items appeared to be underutilized in field feeding of both A and C rations.
3. Dessert items in the C ration were often identified for removal from menus.
4. Fruit items were heavily requested in desert feeding.
5. Greater quantities of meat, beverage, fruit, and dessert were desired by a majority of personnel.
6. Sufficient starchy foods are presently served in the field, and as many as 25% of personnel would accept a reduction in quantity of starchy foods.
7. At least 28% of personnel surveyed indicated that the quantity of food was a problem, some troops indicating it was the most serious problem of any asked.
8. There was substantial confusion among Army troops about whether or not seconds were permitted.

Based on these findings, the following recommendations are made:

1. Acceptability of food items intended for field use should be improved by continued development of new items with increased emphasis on sensory evaluation and acceptance testing.
2. The popularity of, and the low preference of, main items (meats) and desserts in C rations, calls special attention to their continued development.

3. Concepts for field menus should be reevaluated, with specific attention given to menus using higher preference items with reduced variety.

4. Quantities of food served in the field need more sophisticated consideration to insure that the complex factors of nutrition, acceptability, and performance are being properly considered.

The major conclusions from research on Field Food Service Equipment and Food Service Worker Satisfaction and Opinion were:

1. Human factors analysis indicated safety problems related to pressurization in the M-2 burner (including readability of the pressure gauge).

2. Human factors analysis and worker opinion both expressed concern about the safety of relighting the immersion heater.

3. Most difficulty of operation was reported by the workers in cleaning pots and pans and with the immersion heater.

4. Field workers requested the addition of such equipment as refrigeration, something to keep food warm on the serving line, work tables, and adequate pot washing equipment.

5. Customers and workers both favored the use of disposables over the present mess kit, and the substitution of plastic or dining hall utensils for the present mess kit utensils.

6. The major positive aspect of field feeding for the worker was a more relaxed atmosphere with less harassment. The major negative aspects were long hours, bad weather, and moving the kitchens.

7. Customers expressed a positive reaction concerning the attitude and ability of the food service workers.

8. Job satisfaction scores indicated that food service workers in the field were as satisfied with their supervision and the work itself as some Air Force garrison food service workers, although less satisfied with work than a civilian normative sample. The Marine food service workers rated their jobs in the field as about the same as mainside, or better. Army personnel rated their field jobs worse than in garrison. Based on these findings, the following recommendations are made:

1. Formal human factors analysis of all new food service equipment developed for use in the military services be strictly required.
2. Any proposed study of change in the field should include provision for the assessment of worker attitude.
3. As many safety precautions as possible be reengineered into both the M-2 Burner and the Immersion Heater.
4. Further study be undertaken to deal with workable solutions to the problem of long hours, and to the problem of moving the field kitchens. In the latter areas, more detailed attitudinal and human factors measures should be undertaken comparing the M-1948 Kitchen Tent and the Mobile Field Kitchen Trailer.
5. More detailed exploration of the suggested disposable alternatives to the standard mess kit be undertaken.
6. The mutual respect apparently existing between the worker and customer in the field be investigated in more detail to obtain ideas for improving the same relationship in garrison.
7. The additional equipment requested by the workers (i.e., adequate pot washing facilities, devices for keeping food warm on the serving line, etc.) should be added, as practical, in future tests/exercises and evaluated in terms of its contribution to the efficiency and/or quality of the system.

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FIELD FEEDING: BEHAVIORAL SCIENCES STUDIES

INTRODUCTION

The main reason for existence of the Armed Forces is to perform the tasks for which they have been trained while surviving under field, combat conditions. This fact suggests the critical nature of field feeding systems, for these systems support the most fundamental activities of the military. Despite the significance of these systems, however, changes in field feeding during the past decade, while not insignificant, have yielded a system not substantially different from that of World War II and before. This is in comparison to the great change and innovation undergone by the garrison food systems during the same period, which has culminated in the recent studies conducted by the Natick Development Center under the DOD RDT&Eng Program.

Today, troops in the field still eat operational rations of questionable acceptability out of individual metal cans (although this situation is about to change), or they eat hot food prepared on equipment which is far less developed than other non-food equipment on which the military depends. In some cases, this equipment is even counterproductive to the task of safely providing an acceptable, nutritious meal under field conditions. No provision is made for providing the troops with a place to eat, and the outmoded mess kit, or hastily purchased paper plates, do not even provide an adequate container for the food.

As Behavioral Scientists, we were asked to provide input into the study of field feeding being conducted by the Operations Research and Systems Analysis Office at Natick Development Center in response to Army and Marine requirements. Several decisions went into our approach. First, we decided to draw heavily on our experience in studying garrison food service systems, since field food service system planners have tried to duplicate garrison feeding in the field from a food standpoint without a thorough study of whether this is desirable. Our existing data base from garrison studies would make garrison - field comparisons easier.

Second, we decided to collect all of our initial data in actual field situations rather than from those who had previous field experience. Since no combat situation was available, field training exercises were utilized for a data source. It was assumed at the outset that field exercises differ greatly among themselves in the level of realism and in many cases differ from real combat situations. Nevertheless, it was our conclusion that information gathered from the field had a greater probability of being valid than information gathered from people's recollections of the field.

The third decision involved constraints on our approaches. It was decided that any method for field surveys must not involve troops for more than several minutes. Our surveys and interviews used in garrison studies have involved up to 1½ hours of time. An arbitrary limit of five minutes was placed on the time needed for any task by the troops, and a limit of 2 - 3 minutes was aimed for. All materials had to be easily

understood because we expected supervision of surveys to be much more difficult in the field than in a garrison test situation.

The details of the methods are contained in the Method and Results sections. In general, the work was divided into food and human engineering areas. Within the food areas, attention was paid to food likes and dislikes, and the question of food quantities in the field. Within the human engineering area, attention was paid to field food service equipment, and to the food service worker.

METHOD

Survey materials. A large number of surveys were designed especially for this project. A copy of each form is contained in Appendices A1 - A9. A brief outline of each form follows; for detail, the reader should consult the actual form in Appendix A and the appropriate part of the results section.

1) **Food Likes and Dislikes in the Field** -- This one page survey form asks the respondent which individual food items he would like added or removed from both the C ration and A ration meals in the field.

2) **Food Questionnaire** -- This multipage survey asks questions aimed at obtaining the relative importance of food quantity as an issue within the other food variables (quality, variety). Specific information is requested on food classes and food items.

3) **Quantity Interview Format** -- This interview asks whether the respondent received enough to eat yesterday, whether he gets hungry, and whether he can take seconds.

4) **Customer Opinion of the Field Kitchen Worker** -- This one page survey form asks customers to rate their food service workers on several scales and to compare them to their garrison counterparts.

5) **Food Service Worker - Field** -- This survey was filled out by the food service workers, obtaining their attitudes toward their job, and toward the equipment. Open ended questions were completed in a modified interview format with a test administrator.

6) **Mess Kit Survey -- Food Service Workers** -- This one page survey asks the workers' opinions of whether paper or plastic disposable plates, or compartmented trays, were better or worse from the workers' point of view.

7) **Mess Kit Survey** -- This survey asks customers a variety of questions about four substitutes for the standard metal mess kit, and two substitutes for the standard metal field utensils.

8) Field Food Equipment Survey -- Based on field observations and laboratory human engineering analyses of field food service equipment, this questionnaire was developed for administration to experienced food service workers.

9) Salience analysis -- This survey asks respondents' opinions about eight food service factors in an attempt to determine how important each factor is in the field as opposed to in garrison.

Sites. Data was gathered from three military exercises and from students at the Quartermaster School at Fort Lee, Virginia. The exercises were chosen to provide variability in climate, personnel (Army vs Marine Corps; regular troops vs reserves), and environment.

1) Operation Solid Shield, Camp LeJeune, North Carolina, 2 -- 6 June 1974. This large scale exercise involving both Army and Marine Corps personnel extended from amphibious landing areas into dense woods. The climate varied from cool (40°F), damp mornings to sunny, comfortably warm (70°F) afternoons. Personnel subsisted in a great variety of situations. Some headquarters groups had well-designed serving lines and sit-down dining areas under tents. Salad bars and beverage dispensing areas were available. Other groups used stand-up dining areas, with or without tent cover. A few groups, especially forward elements subsisting largely on C rations, ate in the woods without any specific food area. Some Headquarters groups subsisted on all A rations; other groups ate two A ration meals and one C ration meal per day. The main purpose of this work was to test several of the survey forms.

2) 29 Palms, California, 4 -- 7 August 1974. This exercise was composed mainly of Marine Corps reservists with a small percentage of regular Marine Corps personnel including all of the food service workers. The rear area was Camp Wilson, a permanent tent camp site outside of the main base area, with its own water well. The forward area, reached by helicopter, was a totally desolate area 25 miles into the desert from Camp Wilson. The climate was extremely hot, and dry, varying from 80°F at night to over 120°F in the day. Forward troops subsisted on C rations; rear troops (Camp Wilson) subsisted on A rations.

3) Operation Reforger, West Germany, 10 -- 20 October 1974. In this exercise the First Division from Fort Riley, Kansas, was airlifted to West Germany, where they assembled and progressively moved eastward through the Stuttgart area to north of Nuremberg. The character of this exercise was one of constant mobility, especially for forward elements. Even rear, headquarters elements lived in somewhat austere settings with C rations part of every day's food. Most groups ate two C rations and one hot meal (A ration) each day. The weather was cool (40°F) and constantly wet. Tents were available for dining in some areas and not others. C rations were heated before distribution in main unit areas and some forward areas, but were issued cold, by the day, for some small units in forward areas and to all units on the move.

4) Fort Lee, Virginia, 19 November 1974. Experienced food service personnel taking courses at the Quartermaster School were surveyed.

Survey Respondents and Techniques. At the three exercises, both enlisted personnel and officers were surveyed and interviewed. At Fort Lee, officers, enlisted personnel, and some civilians taking food service courses were surveyed. The numbers of personnel surveyed at each location are shown in Table 1. Additional information for each site is described below:

1) Camp LeJeune. Surveys of customers were carried out during meal hours at the meal sites. Interviews and surveys were administered to personnel standing in food lines, sitting or standing at tables, or just leaving the food area. Food service workers were interviewed before or after meal hours at the food service area.

2) 29 Palms. Surveys and interviews of customers were carried out in Camp Wilson at the enlisted and senior NCO-officer dining areas at meal times. Food service workers were interviewed before and after meal times. Forward troops were interviewed in the morning.

3) Reforger. Customers were surveyed in a wide variety of locations including within dining tents, outside dining tents either waiting for food or eating after receiving food, in "combat" areas (near personnel carriers, etc.). Food Service workers were interviewed before and after meals.

4) Fort Lee. Students at the OM School were surveyed during class time. The survey took about ½ hour to complete.

FOOD LIKES AND DISLIKES IN THE FIELD

The survey of food likes and dislikes in the field asked for a listing of food items of both the C ration and the field A ration which respondents wanted added or removed from field menus. Respondents were not required to list items in each category, nor was there a limit placed on the number of responses. Therefore, some listed many C rations for removal while others listed many A items for addition. Our interest in the food likes and dislikes of military personnel in the field was to identify food classes in which new items or menus appear to be needed, or existing items deleted. A minor, secondary result was the identification of problem and attractive foods in the field rations in use during these exercises. It should be noted in this respect that the only C ration used on the exercises studied was the Meal Combat Individual (MCI).

Tables 2 and 3 present listings of the number of items which fell in the four categories of the response sheet (Add C Rations, Remove C Rations, Add A Rations, Remove A Rations) from the various food classes. Individual food items are not identified in most tables, only food classes. In addition, the data are separated into the three field exercises

TABLE 1

Number of Personnel Surveyed/Interviewed

SURVEY/INTERVIEW	Survey Site						TOTAL
	Camp Lejeune		29 Palms		Reforger		
	forward	rear ¹	forward	rear ²	forward	rear	
1. Food Likes and Dislikes	35	20	85	33	45	38	256
2. Food (Quantity) Questionnaire	37	14	106	41	14	61	273
3. Quantity Interview			91	100	44	77	312
4. Customer Opinion of Field Kitchen Worker					8	35	43
5. Food Service Worker	10	16		20	11	29	86
6. Mess Kit Survey Food Service Worker					11	31	42
7. Mess Kit Survey						50	50
8. Field Food Equipment							87
9. Saliency of Food Factors	14	29	96		13	56	208
Total	96	79	378	194	146	377	1357

NOTES:

¹ Force Troops, Hq Bn 2nd Div., Army Units² Camp Wilson

TABLE 2

Numbers of Foods Identified for Addition or Removal from
Field C Rations, Listed in Decreasing Order

ADD	GERMANY		29 PALMS		LEJEUNE	TOTAL
	F ¹	R ²	F ¹	R ²		
Total # of Responses	45	38	33	85	56	257
Extended Meats/Casseroles	8	6	7	19	38	78
Fruits	3	8	22	36	8	77
Misc	9	11	15	16	11	62
Vegetables	14	2	0	9	20	45
Beverages	3	1	3	18	12	37
Meat	12	2	6	17	0	37
Starches	7	2	3	5	7	24
Desserts	1	1	7	4	3	16
Seafood	2	1	3	3	6	15
REMOVE						
Total # of Responses	45	38	33	85	56	257
Extended Meats/Casseroles	23	20	16	28	39	123
Desserts	7	8	12	30	32	89
Meat	13	10	9	11	9	52
Misc	9	6	9	22	0	46
Starches	0	5	8	6	16	35
Beverages	0	0	1	2	3	6
Fruits	0	0	0	2	0	2
Vegetables	1	0	0	0	0	1
Seafood	0	0	0	0	0	0

¹ Forward

² Rear

from which they were collected; for the Reforger exercise and the 29 Palms exercise, the data are further broken down into forward troop and rear troop categories to study the effects of the different feeding situations.

Responses concerning C rations (Table 2) show several clear patterns. The extended meat and casserole class contains the largest number of item responses for both the add and delete categories. Within entree food classes (meat, extended meats and casseroles, seafood), the extended group is the one most amenable to preparation as a C Ration. Dessert items were identified for removal second most often, followed by meats and starchy foods (miscellaneous will not be discussed because it contains many non-food accessory items). The respondents in the three exercises expressed similar opinions about the desired C Ration removals.

In addition to extended meats and casseroles, fruits were identified by a large number of respondents for addition to the C Ration menus, followed by vegetables, meats and beverages. The fruit class shows disproportionately high responses from the 29 Palms exercise, and the Solid Shield Exercise data show a greater desire for extended meats than the other two. Thus, C Ration desserts and extended meats are singled out for deletions; C Ration fruits, beverages, and vegetables are singled out for menu additions; meat and starchy foods are identified for both deletions and additions.

For field A Rations (Table 3), the meat class received the largest number of responses for both add and remove response categories. Recall that for C Rations, the extended meat and casserole class was the largest. Suggested additions to the A Rations menus included items from all the other classes. Requests for additions to the fruit and beverage classes were proportionately more frequent in the 29 Palms data. Removals from the A Ration list were comparatively small in number and percent, but included a small number of items from every class except fruits.

The data presented above deals with the numbers of food items within food classes. In most cases, responses within food classes were distributed across a large number of food items. Subjects requesting that more meat be added to the C or A Ration mentioned several different meat items in expressing their opinions. Subjects requesting that desserts be removed from the C Rations mentioned several different dessert items. In most cases, a given food item received between one and four responses. However, in some cases, there was a more concentrated expression of opinion, and these items are worth identifying.

For the C Rations, ham and eggs was the item most frequently identified for removal (Table 4) with more than 24 subjects in each field exercise expressing this opinion. In second place was the grouping of baked desserts accounting for 26 and 36 responses at Camp LeJeune and 29 Palms respectively, and 9 responses from Reforger. One other item, crackers, was mentioned regularly in all three exercises. Although ham and lima beans, peanut butter, and chocolate were mentioned in relatively moderate numbers at 29 Palms, responses at other exercises were small. Responses to all other items did not exceed 3 instances.

TABLE 3

Numbers of Foods Identified for Addition or Removal from
Field A Rations, Listed in Decreasing Order

ADD	GERMANY F ¹	R ²	29 PALMS F ¹	R ²	LEJEUNE	TOTAL
Total # of Responses	45	38	33	85	56	257
No Response	14	16				
Meats	19	15	4	37	7	82
Misc	8	8	0	16	2	34
Fruits	5	3	0	23	0	31
Beverages	6	1	4	14	2	27
Vegetables	8	2	2	12	2	26
Starches	2	1	2	11	1	17
Extended Meats/Casseroles	2	0	0	7	5	14
Desserts	3	2	1	5	3	14
Seafood	4	0	0	7	1	12
REMOVE						
Total # of Responses	45	38	33	85	56	257
No Responses	31	31				
Misc	6	1	3	20	2	32
Meat	5	5	0	13	4	27
Starches	0	3	1	10	1	15
Vegetables	0	2	0	7	0	9
Extended Meats/Casseroles	3	0	2	4	0	9
Beverages	0	0	0	8	0	8
Desserts	3	0	0	1	0	4
Seafood	0	0	0	0	0	0
Fruits	0	0	0	0	0	0

¹ Forward

² Rear

TABLE 4

Specific Items Identified with Relatively Large Frequency*
for Addition or Removal from Field C Ration

REMOVE	GERMANY	29 PALMS	LEJEUNE
Ham and Eggs	29	26	25
Cakes	9	31	26
Spiced Beef	6		
Crackers	5	10	11
Ham and Limas		8	
Peanut Butter		9	
Chocolate		4	
ADD			
Stews			19
Chili			12
Pepper			6
Creamed Corn			5

*All other response frequencies were 0, 1, or 2.

TABLE 5

Specific Items Identified with Relatively Large Frequency*
for Addition or Deletion from Field A Rations

REMOVE	GERMANY	29 PALMS	LEJEUNE
Burned Meats		4	
Starches		6	
Spoiled Milk		7	
Powdered Eggs		5	
ADDS			
Steak	9	7	
Hamburger	6	4	
Hot Dogs	4		
Pork Chops	5		
Ham		4	
Fruit		16	
Fresh Milk		5	
Fish		5	

*All other response frequencies were 0, 1, and 2.

For addition to C Ration menus, there was a general request for addition of more meat and vegetable items. At 29 Palms and at Reforger no item was mentioned more than four times although a large variety of meats and vegetables were mentioned. At Camp LeJeune, stews and chili were frequently mentioned, and chili pepper and creamed corn were moderately mentioned.

For field A Ration items, no clear pattern across exercises was observed, especially with respect to items mentioned for removal from menus (Table 5). At 29 Palms, respondents did identify several items which were observed to represent problems at that exercise (e.g. spoiled milk). Additions to A Ration menus included steak and hamburger at Reforger and 29 Palms, and hot dogs and pork chops at Reforger alone. Fruit was heavily requested at 29 Palms, along with a moderate desire for fresh milk, ham and fish. In all cases, individual items did not receive more than two responses.

CONCLUSIONS & RECOMMENDATIONS

1. Similar to findings in several studies of consumer opinion in garrison (Branch et al, 1974 a, b), meat items accounted for the majority of customer likes and dislikes in the field. This suggests that major emphasis be placed on continued development of new meat items, and deletion of unpopular ones. The troops are aware that simple prepared meats are inappropriate for a C Ration so that inclusion of a steak or hamburger in the C Ration is not critical.

2. Vegetables, while recognized as perhaps the most disliked food class, appears to have been under used in field feeding. For both C and A Rations, there are more requests for additional vegetables than for deletions of vegetables. It appears that if additions of vegetables are kept to the few higher preference items, added vegetables might prove to be a surprising boost to field menus. Naturally, in a field menu of A Ration items, low preference items must be avoided where no choice among items is available.

3. Desserts appear to be a problem with the C Ration in these exercises. Alternatives must be found.

4. Special consideration should be given to additional fruit items in the rations for desert feeding.

5. In general, we recommend further study on the use of high preference menus for field use. Because of limitations of selection with the C or A Rations, and because of the large cost of development of rations, we recommend the field test of a small variety, high preference menu. Larger variety with the necessary moderation of high preference should be used only when choices are available in larger feeding operations.

FOOD QUANTITY

A paper and pencil survey and an interview were used to investigate the problems associated with the quantity of food served in the field.

Food Quantity in the Field. Table 6 and Appendix 8 show the responses men gave to the question of whether or not food quantity in general was a problem while in the field. The question was embedded in a list of related questions concerning factors such as food quality and food variety. (See Appendix A for the Questions). In an early version of the survey, Marines at Camp LeJeune, who were receiving mostly A rations, appeared very dissatisfied with the quantity of food they were receiving with 55.3% of them indicating that food quantity was either a "minor problem" or a "significant problem" in the field (Appendix B). Further, respondents listed this as a problem area more than any other area, except for food quality. Even though food quality received an equal number of responses, food quantity still appears to be the more serious problem in that 23.7% of the men considered food quantity to be a "significant problem" as opposed to 7.9% for food quality.

Of the Marines at Camp Wilson 29 Palms, where the men were receiving A Rations, 31.7% indicated that food quantity was "bad" or "very bad". However, a greater number of respondents listed the general eating area, food quality, and service by mess personnel as "bad" or "very bad".

Similar results were obtained from the respondents on the front line at 29 Palms, who were on C rations, with 28.2% indicating that food quantity was "bad" or "very bad" in the field. Also, in this situation, food quantity was not seen to be a problem by as many men as was the general eating area, the quality of the food, service by mess personnel, or food variety.

Results from Army enlisted men on the Reforger exercise in Germany who were eating C Rations for two meals a day indicated that 33.8% say food quantity was "bad" or "very bad", a figure similar to that obtained from Marines at 29 Palms. However, in contrast to the Marines at 29 Palms, Army personnel viewed food quantity as more of a problem than any other area.

In summary, at least 28.2% of the Army and Marine Corps personnel surveyed at each installation or exercise felt that food quantity was a problem to some extent.

The next question on the quantity survey was concerned with the adequacy of the serving size of foods in various food classes (Appendix C). Beverages appeared to be a major problem (Table 7). Most Marines in the field at Camp LeJeune (88.6%) felt that they needed "more" or "much more" beverages, with 42.9% stating that they needed "much more". Following beverages, fruit was desired in greater quantity with 80.0%

TABLE 6

Percentage of Respondents Indicating Dissatisfaction
with Aspects of Their Dining Situation
(total of "bad" and "very bad" responses)

	29 Palms Camp Wilson %	29 Palms forward %	Germany Reforger %
A. Eating area	56.6	56.2	21.6
B. Meal hours	13.0	22.5	21.7
C. Monotony of same eating area	36.6	30.8	6.8
D. Food quality	48.1	47.6	25.7
E. Food quantity	31.7	28.2	33.8
F. Service by mess personnel	47.6	39.5	21.7
G. Food variety	34	37.5	21.7

TABLE 7

Percentage of Respondents Wanting More Food
in a Meal
(Total of "more" and "much more" responses)

Food Class	Camp LeJeune %	29 Palms Camp Wilson %	29 Palms forward %	Germany Reforger %
A. Meats	75	49.6	63.4	82.8
B. Casseroles	58.8	38.7	30.8	50.7
C. Starchy Foods	24.3	15.5	14.6	20.2
D. Vegetables	56.7	36.5	52.5	40.5
E. Salads	57.6	30.4	61.5	30.4
F. Beverages	88.6	61.9	85.4	66.6
G. Desserts	62.8	57.6	51.2	72.9
H. Breads	48.5	24.5	22.5	28.9
I. Fruits	80	65.4	75.6	62.3
J. Soups	67.7	23.8	28.2	34.7

of the respondents indicating that they wanted "more" or "much more", and meat was desired "more" or "much more" by 75%. Actually, all food classes, with the exception of starches were desired in greater quantity by 50% or more of the men surveyed. Starch was the only category in which a substantial number of men indicated that they needed "less" (29.7%) or "much less" (5.4%) than was currently being received. In addition it was the only category in which more men indicated that less was needed rather than that more was needed.

The food classes with serving size problems at Camp LeJeune also turned out to be problems at 29 Palms. Beverages again headed the list with 61.9% of the Marines at Camp Wilson and 85.4% of the Marines on the front lines indicating that they wanted "more" or "much more". Corresponding figures for fruit were 65.4% and 75.6%. The next highest category at Camp Wilson was dessert (57.6%), followed by meat (49.5%); while for front line troops eating C Rations it was meat (63.4%) followed by vegetables (52.5%) and dessert (51.2%). Starch again was lowest in rank with 27.2% of the Camp Wilson Marines and 26.8% of the front line troops actually indicating that they wanted "less" or "much less" starch. For the men eating C rations on the front lines at 29 Palms, salad was also important with 61.5% indicating that they needed "more" or "much more".

More Marines at Camp LeJeune wanted more food for all food classes than did the Marines at 29 Palms. The reason for this difference cannot be extracted from the information at hand, however, because there are several variables which were confounded in these studies including but not limited to climate (warm and humid vs. hot and dry), type of service (regular Marines vs. Marine reservists) and experience of food service personnel.

Army personnel in Germany showed trends similar to the Marines in their responses concerning quantity. Meat was selected by the greatest number of respondents (82.8%) as being wanted in greater quantity, followed by dessert (72.9%), beverage (66.6%), and fruit (62.3%).

These four food classes were the same as those of concern to the greatest number of Marines although the order is slightly different. The Army personnel were also in close agreement with the Marines concerning starch with only 20.2% indicating that they needed "more" or "much more" starch and 21.7% indicating that they actually needed "less" or "much less".

In summary, then, it appears that substantial percentages of Army and Marine personnel want more beverages, fruit, meat, and dessert in the field and smaller, but still substantial percentages report that they could use less starch. It would appear from the above results, that getting enough to eat of the food one wants while in the field is a problem for both Army and Marine personnel. These results are supported by the observations of the authors that little or no food was thrown away by the men during the exercises.

Food Quantity in Field and Garrison. The data from the question concerning the quantity of food desired in the field compared to garrison provided essentially the same results as the previous question (Table 8, Appendix D). The foods which most men indicated that they wanted served in larger quantity in the field compared to the garrison were the same foods as those which the men indicated should be served in greater quantity than was currently served in the field. These included the food classes of beverage, fruit, meat and dessert. Although most respondents at all sites indicated that they wanted the same quantity of starch, a substantial number of men again singled it out as being wanted in smaller quantity. Casseroles were also viewed by a substantial number of men as being wanted less in the field than in garrison. This was especially true of front line Marines at 29 Palms and Army troops in Germany.

The last page of the quantity questionnaire attempted to elicit responses concerning specific foods with regard to both "portion size" and "frequency of serving". Unfortunately, the responses given by the men usually referred to food classes rather than food items despite emphasis on specific foods in the instructions. Also, many men failed to fill out this portion of the questionnaire. In any case, the responses to the question of "serving size" are summarized in Appendix E. The foods listed are the same ones that most men listed as problems in the earlier part of the questionnaire. These primarily included meat, beverage, fruit, and dessert, regardless of climate and type of service (Army or Marines) with meat consistently being listed more frequently than other food class. The only specific food item which frequently was mentioned by men was milk and this response was primarily characteristic of Camp Wilson, 29 Palms where it had been noted by the authors that milk was frequently served sour after having been transported from the main post to the field in the hot sun.

The question on "frequency of serving" of specific foods produced similar results. (Appendix F). The food class desired more frequently by the greatest number of respondents was meat; with beverages, desserts and fruit being listed by several respondents.

Steak was the only specific food item consistently listed by a large number of respondents as being wanted more frequently. In short, the final page of the quantity questionnaire merely served to substantiate the results from the first portion in showing that men in the field want a greater quantity of food in certain food classes, viz., meat, beverage, fruit, and dessert.

"Seconds" in the Field. The question of whether or not the men were aware that they could go back for "seconds" after having once passed through the serving line was investigated with a supplemental questionnaire at 29 Palms and in Germany. Eleven percent of the Marines at Camp Wilson, 29 Palms, stated that they did not get enough to eat the day before and 9% said that they got hungry between meals (Table 9). However, almost all of these respondents also indicated that they could go back for seconds if

TABLE 8

Percentage of Respondents Wanting More Food
in Field
(Total of "much more in field" and "more in field"
responses)

Food Class	Camp LeJeune %	29 Palms Camp Wilson %	29 Palms forward %	Germany Reforger %
A. Meats	74.3	56.7	58.5	73.9
B. Casseroles	48.6	33.3	22	43.1
C. Starches	28.2	29.8	25	27.7
D. Vegetables	64.1	45.4	48.8	47.7
E. Salads	59.4	45.8	56.4	41.5
F. Beverages	89.1	75.8	85	64.6
G. Desserts	55.2	52.6	55	58.4
H. Breads	48.5	30.5	32.5	32.3
I. Fruits	76.9	66.0	80	69.2
J. Soups	55.3	25.8	23.1	56.9

TABLE 9

Camp Wilson, Twenty-nine Palms
Number and Percentage of Marines Responding to Questions
Concerning Getting Enough to Eat and Going Back for
"seconds"

Did you get enough food at your meals yesterday?	Do you get hungry between meals?	Can you go back for seconds?	Do you go back for seconds?
Yes 80 (89%)	Yes 29 (32%)	Yes 27 (30%)	Yes 9 (10%)
		No 18 (20%)	No 18 (20%)
		Yes —	Yes —
	No 51 (57%)	No —	No —
		Don't	Yes —
		Know 2 (2%)	No 2 (2%)
No 10 (11%)	Yes 8 (9%)	Yes 47 (52%)	Yes 9 (10%)
		No 38 (42%)	No 38 (42%)
		Yes —	Yes —
	No 2 (2%)	No 1 (1%)	No 1 (1%)
		Don't	Yes —
		Know 3 (3%)	No 3 (3%)
Total	Yes 37 (41%)	Yes 4 (4%)	Yes 4 (4%)
		No 4 (4%)	No 4 (4%)
		Yes —	Yes —
	No 53 (59%)	No —	No —
		Don't	Yes —
		Know —	No —
	Yes 80 (89%)	Yes 1 (1%)	Yes 1 (1%)
		No —	No —
		Yes —	Yes —
	No 10 (11%)	No —	No —
		Don't	Yes —
		Know 1 (1%)	No 1 (1%)
		Yes 83 92%	Yes 23 (26%)
		No 1 1%	No 67 (74%)
		Don't	
		Know 6 7%	

they so desired. Interestingly, each of the 4% of the respondents who indicated that they did not go back for seconds even though they were hungry and knew they could go back for more, said that the reason for this was "poor food quality".

It thus appears that the Marines at the 29 Palms exercise had a rather small percentage of individuals who did not get enough to eat each day in the field. This is in marked contrast to Reforger where 24% of the respondents indicated that they did not get enough to eat the day before and 23% indicated that they got hungry between meals (Table 10).

Furthermore, most of these respondents said that they were not allowed to go back for "seconds".

There appears to be a great deal of confusion among Army personnel as to whether or not they can go back for seconds. The summary at the bottom of Table 10 shows that 31% of the men that were interviewed said that they could go back for "seconds" while 47% said that they could not and 16% said that they did not know one way or the other. This confusion may be due to different policies in various units as well as to misunderstanding on the part of the men. In any case, the situation appears to be much better in the Marine Corps where 92% of the men said that they knew that they could go back for "seconds".

A modified form of the "seconds" questionnaire was administered to the front line Marines at 29 Palms. Since they were on C Rations, which precluded getting "seconds" they were simply asked whether they got enough food the day before, whether they got hungry between meals, and whether they received enough water. Table 11 indicates that almost all Marines in this situation indicated that they were receiving enough food and, contrary to what might be expected in the desert summer, enough water.

CONCLUSIONS AND RECOMMENDATIONS

1. Two major problems emerge from the questionnaires on food quantity. First, substantial numbers of Marine and Army personnel (over 80% in some instances) appear to want greater quantities of meat, beverage, fruit and dessert while they are in the field, and a reduction in quantity of Starch would be acceptable to as many as 25% of the men.

2. Second, there is confusion over whether or not troops can return for "seconds" during a meal, this problem appears to be more characteristic of the Army than the Marine Corps. As many as 24% of Army troops said they do not get enough to eat in the field and most of these troops indicated that they cannot go back for "seconds".

TABLE 10

Germany
Number and Percentage of Army Personnel Responding to Questions
Concerning Getting Enough to Eat and Going Back for
"seconds"

Did you get enough food at your meals yesterday?	Do you get hungry between meals?	Can you go back for seconds?	Do you go back for seconds?
Yes 92 (76%)	Yes 56 (46%)	Yes 21 (17%)	Yes 14 (12%)
		No 7 (6%)	No 7 (6%)
		Sometimes 5 (4%)	Yes 3 (2%)
		No 20 (17%)	No 2 (2%)
		Don't Know 10 (8%)	Yes —
		Yes 11 (9%)	No 20 (17%)
	No 36 (30%)	Sometimes 2 (2%)	Yes —
		No 14 (12%)	No 10 (8%)
		Don't Know 9 (7%)	Yes 3 (2%)
		Yes 5 (4%)	No 8 (7%)
		No 22 (18%)	Yes 1 (1%)
		Don't Know 1 (1%)	No 1 (1%)
No 29 (24%)	Yes 28 (23%)	Yes —	Yes —
		No 14 (12%)	No 3 (2%)
		Don't Know 9 (7%)	Yes —
		Yes 5 (4%)	No 22 (18%)
		No 22 (18%)	Yes —
		Don't Know 1 (1%)	No 1 (1%)
Total	No 1 (1%)	Yes —	Yes —
		No 1 (1%)	No —
		Don't Know —	Yes —
		Yes 37 (31%)	No 1 (1%)
		Sometimes 7 (6%)	Yes —
		No 57 (47%)	No 23 (19%)
No 29 (24%)	No 37 (31%)	Don't Know 20 (16%)	Yes 23 (19%)
			No 98 (81%)

TABLE 11

Front Line, Twenty-nine Palms
Number and Percentage of Marines Responding to Questions
Concerning Getting Enough Food and Water While in the Field

Did you get enough food at your meals yesterday?		Do you get hungry between meals?	Did you get enough water yesterday?
Yes 94 (94%)		Yes 44 (44%)	Yes 41 (41%) No 3 (3%)
		No 50 (50%)	Yes 49 (49%) No 1 (1%)
No 6 (6%)		Yes 6 (6%)	Yes 6 (6%) No —
		No —	Yes — No —
Total	Yes 94 (94%) No 6 (6%)	Yes 50 (50%) No 50 (50%)	Yes 96 (96%) No 4 (4%)

3. This result is supported by the results of two earlier studies which were concerned with the adequacy of C Rations and MRE's (meal, ready to eat). For instance, Harmon (1974) found that 25.9% and 36.4% of the Army personnel in his study said that they were not receiving enough food when subsisting on MRE's and C Rations, respectively. Hilz (1974), who was interested in the adequacy of MRE's, also found that 36% of the respondents in her study felt that they did not get as much food as they wanted from the MRE's and that more should be served.

4. Based on these findings, it is recommended that consideration be given to alternatives for improving attitudes toward food quantity. It is not suggested that simply more food be made available, because in most instances enough food is available. What appears to be the problem is that not enough preferred food is available, producing a situation in which men do not get enough to eat of what they want. Therefore, the quantity issue is most likely tied to the preference issue discussed earlier in this report. Moving towards higher preference menus, especially where menus are non-selective (no choice) should help in solving the two problems of preference and quantity.

FIELD FOOD SERVICE EQUIPMENT

This chapter is concerned with several of the pieces of equipment used by the food service worker in the field. Appendix G-1 shows the number of workers surveyed/interviewed on each exercise, or in school, by rank. Note that the cooks surveyed at Fort Lee tended to possess higher rank than the personnel surveyed elsewhere. Also, the Army personnel surveyed in Germany appear to hold higher rank than their Marine counterparts at 29 Palms who were sampled for this study.

At 29 Palms and in the Reforger '74 field exercises in Germany, a worker survey/interview was administered which dealt with general opinions of the major pieces of equipment used in the field. In addition, in Reforger, two related surveys were given — one dealing with worker opinion of alternatives to the standard metal mess kit and the other with customer opinion of similar alternatives.

Concurrent with the survey efforts in Germany senior food service NCO's assigned to Natick Development Center (at that time Natick Laboratories) were interviewed concerning field feeding equipment, and an in-laboratory human factors analysis was conducted of the major pieces of field food service equipment — the M-2 burner, the M-1959 range, and the M-1967 immersion heater. Based on these interviews and analyses, field observation at the three exercises, and preliminary analysis of responses to the general opinion of field equipment sections of the Reforger survey, another survey was developed and administered to a sample of military and civilian food service workers who were attending the Army food service school at Fort Lee, Virginia.

General Worker Opinion of Field Equipment. General opinions concerning the main items of field feeding equipment were obtained at 29 Palms and in Reforger with 3 five-point Likert scale questions dealing with ease of setting up, ease of operation, and safety. Response possibilities ranged from very hard to very easy for the first two questions, and from very unsafe to very safe for the third.

Workers at both exercises were in general agreement, on the average, indicating that setting up the tent was neither easy nor hard and that setting up the serving line approached being fairly easy (Table 12). The validity of the response about the tent should probably be tempered by some comment. The standard M-1948 mess tent was not used by the Marines at 29 Palms — a GP medium tent was used on a wooden frame and not moved, and in the Reforger exercises, only about half of the workers interviewed were using the M-1948 tent and moving from place to place.

The reported ease of setting up the mess kit laundry line differed between 29 Palms and Reforger with the Marines, on the average, rating it between neither easy nor hard to set up and fairly easy to set up, and the Army workers rating it between neither

TABLE 12

Ease of Setting Up Equipment – Mean Responses

Scale				
1 Very hard	2 Fairly hard	3 Neither hard nor easy	4 Fairly easy	5 Very easy
		29 PALMS	REFORGER	MEAN
Tent		2.84 (1)*	3.15 (0)	3.00
Mess Kit Laundry Line		3.71 (6)	2.79 (10)	3.25
Serving Line		3.94 (3)	3.90 (1)	3.92

*Number of workers reporting never having set up the piece(s) of equipment.

easy nor hard and fairly hard. Again, the Marines did not move the kitchen in the 29 Palms exercise and had to set up the line only once, even then setting up fewer units than regulations call for. In addition, there was piped water available at the field kitchen site in the 29 Palms exercise, while Reforger personnel were required to pick up their water from remote water points.

Tables 13 and 14 deal with the responses to the questions concerning ease of operation and safety. For the most part, the workers in the two field operations agreed about the ease of operation. In the safety area, however, the Reforger personnel tended to rate the items as more safe than the 29 Palms Marines (with the exception of cooking on the move).

Note, that in rating the ease of operation (Table 13) the only operation rated on the hard side of neutral, on the average, was pot cleaning — and then only very slightly. The M-1937 burner and range were rated between neither easy nor hard and fairly easy (the 29 Palms survey asked only about the range unit as a whole). The M-2 burner, M-1967 immersion heater, the M-1959 range were all rated, on the average, as fairly easy to operate. The data concerning use of the equipment is interesting in indicating that almost half of the Marines (9 of 20) reported never having used the M-2 burner and half (10 of 20) gave the same response for the M-1959 range. On the other hand, the Army personnel appear to have had less experience with the older M-1937 pieces of equipment (8 or 9 out of 40).

Table 14 indicates that the average response about safety of cooking on the move was similar for both exercises — approaching fairly unsafe. Approximately a third of the workers in each sample reported never having cooked on the move. Both groups also rated the M-1967 immersion heater between neither safe nor unsafe although the 29 Palms average response approached fairly unsafe while the Reforger group's average response approached neutral. The M-1937 range and burner, the M-2 burner, and the M-1959 range were all rated between neutral and fairly safe.

Responses to the interview questions concerning replacing or adding equipment to the field feeding situation tended to support these responses to the survey question (Appendix G-2). Sixteen out of sixty workers reported that nothing needed replacing. Four or more workers suggested replacing the following pieces of equipment: immersion heater (14), M-1937 burner (14), kitchen tent (8), mess kit laundry line — with a larger receptacle for washing pots (5), and the spatula — with a shorter-handled model to allow easier turning of grilled items (4). Note that the largest number of workers suggesting the replacement of the M-1937 burner were the Marines at 29 Palms who were using it exclusively (most of the Army kitchens in Reforger were using M-2's and M-1959's). Likewise, the responses concerning the M-1948 kitchen tent came mostly from the Army personnel in Reforger who were using the tent in the exercise.

TABLE 13

Ease of Operation of Equipment -- Mean Responses

Scale				
1	2	3	4	5
Very hard	Fairly hard	Neither easy nor hard	Fairly easy	Very easy
	29 PALMS	REFORGER	MEAN	
Pot Cleaning	3.12 (4)*	2.74 (7)	2.93	
M-1937 Burner	—	3.56 (8)	3.56	
M-1937 Range	3.59 (3)	3.81 (9)	3.70	
M-2 Burner	3.93 (9)	4.08 (3)	4.00	
Immersion Heater	4.00 (2)	4.03 (2)	4.02	
M-1959 Range	3.90 (10)	4.26 (5)	4.08	

*Number of workers reporting never having used this piece(s) of equipment.

TABLE 14

Safety of Equipment — Mean Responses

Scale				
1	2	3	4	5
Very unsafe	Fairly unsafe	Neither safe nor unsafe	Fairly safe	Very safe
	29 PALMS	REFORGER	MEAN	
Cooking on the Move	2.31 (7)*	2.32 (15)	2.32	
Immersion Heater	2.22	2.95	2.58	
M-1937 Range	2.75	3.66	3.20	
M-2 Burner	2.92	3.59	3.26	
M-1937 Burner	—	3.31	3.31	
M-1959 Range	2.90	4.02	3.46	

*Number of workers reporting never having used this piece(s) of equipment.

As might be expected, the number of workers who recommended adding any specific piece of equipment was smaller. Fifteen workers had nothing to suggest. Several items were mentioned by one or two workers; three or more workers suggested the addition of the following pieces of equipment: something to keep the food warm on the serving line (7), better or more refrigeration (4), bakery unit (3), work tables (3), portable grille (3), and cutting board (3).

Human Factors and Safety. Information on human factors oriented problems concerned with operation and safety of field food service equipment was obtained in field observation during the 29 Palms and Reforger exercises. At the same time the Reforger survey and observation effort was being carried out, a more traditional, detailed laboratory human factors analysis of three key pieces of equipment (the M-2 burner unit, the M-1959 range cabinet, and the M-1967 immersion heater) was conducted at Natick Development Center focussing on safety and ease of use. Considering the large number of pieces of such equipment in frequent use in the field, the relatively small number of accidents reported could be interpreted as indicating that the equipment is basically safe. On the other hand, if suggestions can be made to improve ease of operation or safety, hopefully the number of serious injuries and fatalities might be reduced.

The M-2 burner would seem to be a candidate for some improvements in safety and ease of operation. During field observation of this unit it was noted that many of the workers felt that the unit was basically a good one. The laboratory human factors analysis indicated that ease of operation and safety both could be improved by moving the pressure gauge forward, approximately two inches, (out from the unit) and angling it upward to provide easier viewing by kitchen personnel. Such an improvement would seem to be extremely important since explosion caused by overpressurizing is probably the most dangerous occurrence in the field kitchen. The dial on the pressure gauge is quite well color coded — yet might lead to easier operation if it gave an indication of the correct pressure range for initial lighting. Replacement of the "tire valve" air pressure fitting with a permanently attached hand pump would preclude inadvertent overpressurization with compressor air hoses attached to vehicles — a method reportedly utilized. A final safeguard against pressure buildup during use could be some type of automatic, pressure operated, flame cutoff valve.

The laboratory analysis also suggested that folding handles could be fitted to the sides of the burner unit to allow easier and safer carrying of the lighted unit. In the field exercises observed, workers generally transported the burner by grasping both ends, and carrying it, lighted, to the range cabinet. In order to slide it into the cabinet with this grip, the worker had to put one forearm over and close to the open flame. Side handles would obviate this problem.

Field observation indicated that the M-2 was occasionally misused without either of the heat shields — apparently to avoid cleaning them — and very often was used on the ground outside the M 1959 range cabinet — again to avoid cleaning problems according to several workers. The laboratory human factors analysis suggested a more easily cleaned surface for the shield, if possible, and removable side and back panels.

When the burner was used outside the cabinet in the field exercises, the large pots were often placed directly on the frame of the burner without the cradle provided for such situations. The frame might be strengthened to avoid potential bending from such misuse.

Several workers have reported that the immersion heater often goes out and produces a small explosion upon relighting, with potential danger of facial burns when the worker performing the lighting task leans too close. The laboratory analysis suggested the addition of baffles to prevent blowout under windy conditions, and to prevent the operator from looking directly into the fire chamber during lighting operations. Field observation also indicated a fair amount of denting and bending of the stovepipes on the heater (probably during transit). If this problem could be corrected, units would probably be easier to assemble.

One more problem relating to ease of operation of equipment became apparent during field operations — the erecting of the M-1948 kitchen tent. The introduction of such an alternative as the mobile field kitchen trailer developed at Natick Development Center should assist in alleviating this problem. (In Reforger, one unit was observed getting a kitchen tent sufficiently erect to start cooking — not completely up and secured — in over an hour while the kitchen trailer was totally prepared in 29 minutes — and with what appeared to the observers to be considerably more ease).

Food Service School Student Evaluation of Specific Problem Areas in Field Equipment. Based on preliminary analysis of the general opinion of field equipment obtained in the 29 Palms and Reforger exercises, interviews with senior NCO's assigned to Natick Development Center and results of the laboratory human factors analysis and field observations, a detailed eleven question field food equipment survey was developed and administered to a group of 87 military and civilian food service workers who were attending the Food Service School at Fort Lee, Virginia (see Table 1). The questionnaire was administered during regular class sessions to groups averaging twenty members with the surveys taking an average of 25 minutes to complete.

The first ten questions of the survey each dealt with a specific item of field feeding equipment. Several operations or potential problem areas were listed under each item. Respondents were asked to indicate, by placing a check mark in the appropriate column, whether each particular operation had *generally* been a problem in the field or had *generally not* been a problem in the field. The respondent was allowed the opportunity to indicate

unfamiliarity with any piece of equipment or to specify any difficulties he might have encountered which were not among the listed alternatives.

The last item in the questionnaire was a check list of food service equipment not currently included in the Table of Organization and Equipment (T, O, and E) of field food service units. Respondents were instructed to place a check mark next to any item which they felt would be a worthwhile addition to the field kitchen, and again were allowed to add items not among the listed alternatives.

Data were analyzed by calculating a percentage score for each response category. On the first ten questions, those individuals who indicated that they had never used a particular piece of equipment were excluded from the analysis of that item. In this chapter only problem areas to which 25% or more workers responded are reported. The questions are reported in order of the number and severity of problems reported. Each question is identified by its survey number to facilitate reference to the survey in the appendix. Appendix G-3 shows the percentage of respondents citing each category of each piece of equipment as a problem.

The M-1948 Kitchen Tent (Question 8) was the item of equipment with the most problem areas checked by 25% or more of the respondents. The two major problems cited were the ease of erecting the tent (64%) and the high temperatures inside the tent (59%). Ease of striking the tent (41%), transporting the tent (40%), and shrinking of the canvas portion of the tent (25%) were also reported. All of these problems are operational or equipment performance problems.

The M-1967 Immersion Heater (Question 4) had four areas cited by the workers as problems: cleaning (48%), relighting when hot (41%), safety of lighting (38%), and transporting (26%). Here the major problem is one of cleaning with the other three being operational problems. There were very few complaints about the heating capability of the heater (3%).

A high percentage of the workers (61%) complained about the 32 gallon can (Question 3) as a receptacle for washing pots and pans, while a lower percentage (38%) were concerned about transporting the cans and setting them up — again operational problems. Obtaining spare parts for (55%) and moving a lighted (34%) M-2 Burner (Question 7) were also mentioned by respondents. Viewing the pressure gauge was viewed as a problem by only 5% of the workers.

Workers felt that *Disposable Serving Gear* (Question 10) was too small to hold the average meal (55%) and were concerned about maintaining an adequate supply (30%). For the M-1949 Water Trailer (Question 2) freezing of the water pipes (53%) was cited as the major problem with cleaning the water tank a secondary one (31%).

Responses to the question about the *Insulated Food Container* (Question 9) indicated that keeping the food hot when the can isn't preheated (48%) was a problem (units observed in the field were not preheating as a rule) and 26% reported waterlogging of cans as a potential problem. Finding enough (28%) or a good selection (25%) of the *Range Accessory Equipment* (Question 6) were also reported as problem areas.

Cleaning the M-1959 *Range Cabinet* (Question 2, 32%) and maintaining the *Beverage Dispenser* (Question 1, 30%) were the final two complaints registered by the respondents.

In summary, most of the comments dealt with operational problems. Other general problem areas cited included cleaning problems (four items), maintenance problems (three items), safety problems (three items), and transportation problems (three items).

Responses to the question about adding equipment were for the most part positive; even the lowest category, baking equipment, received 46% affirmative responses (Appendix G-4). Eighty seven percent of the workers thought that the addition of portable refrigeration equipment would be desirable. The other items cited were folding tables (74%), folding serving tables (72%), larger washing container for pots and pans (71%), larger grille (64%), serving line warming equipment (59%), duck boards (56%), cutting board (52%), and baking equipment (46%).

Alternatives to the standard metal mess kit and utensils. In the Reforger exercise, surveys were administered to 42 food service workers concerning some potential alternatives to the standard metal mess kit, to 44 customers concerning similar alternatives to the mess kit, and to 37 customers concerning alternatives to the present utensils.

The workers were presented with a five point Likert scale question asking how substituting paper or plastic disposable plates for the standard metal mess kits would affect six different areas. Table 15 indicates that, on the average, the workers felt that in the area of rubbish disposal, the use of disposables would fall between having no effect and being a little worse. Field observations by Natick Development Center personnel at Reforger noted the potential for such a disposal problem. In the area of storage, the average response indicated no effect; while the areas of sanitation, number of K's, ease of serving the meal, and mess kit laundry line led to average responses falling between no effect and a little better with the latter two being closer to a little better. A mean for the six areas leads to an overall estimate of 3.25 on a five point scale -- between no effect and a little better. If disposables were to be used, the workers were evenly divided in terms of whether the best disposal method would be burning or burying.

Responses to a similar five point Likert scale question asking about the substitution of compartmented trays to be cleaned by the customer and stored by the field kitchen led to lower responses across the board (Table 16). Storage, sanitation, mess kit laundry

TABLE 15

Worker* Opinion of Substituting Paper or Plastic Disposable
Plates for the Mess Kit

Area	Frequency of Response					Mean
	1 Much worse	2 Little worse	3 No effect	4 Little better	5 Much better	
Rubbish disposal	9	14	12	6	1	2.43
Storage	5	13	10	6	8	2.98
Sanitation	9	8	4	7	14	3.21
Number of KP's	2	4	16	12	8	3.48
How easy to serve a meal	2	2	16	10	12	3.67
Mess kit laundry line	2	3	13	10	14	3.74

* 42 Workers

TABLE 16

Worker* Opinion of Substituting Non-Disposable Compartmented Trays**
for the Mess Kit

Area	Frequency of Response					Mean
	1 Much worse	2 Little worse	3 No effect	4 Little better	5 Much better	
Storage	15	12	8	5	2	2.21
Sanitation	17	5	10	7	3	2.38
Mess kit laundry line	15	7	12	4	4	2.40
Number of KP's	9	7	16	6	4	2.74
Rubbish disposal	5	6	21	4	6	3.00
'low easy to serve a meal	3	2	20	8	9	3.43

*42 Workers

**To be cleaned by user, stored by field kitchen

line and the number of KP's were all rated between a little worse and no effect with the former areas falling closer to a little worse. Such a substitution would be expected to have no effect on rubbish disposal and between "no effect" and a "little better" in terms of ease of serving the meal. An overall estimate based on a mean for the six areas is 2.70 — on the "little worse" side of neutral.

One overall conclusion which can be made from this data (and which was also confirmed by field observatinn) is that it is difficult to serve a meal in the present mess kit.

The customers were asked to evaluate five possible methods of serving food in the field — the mess kit, a compartmented tray which would be cleaned by the customer and stored by the field kitchen, a plastic disposable compartmented tray, disposable paper plates, and disposable plastic plates — in terms of whether each was acceptable or not acceptable in five areas (a response of not certain was also allowed).

Table 17 was compiled by scoring +1 for each response of acceptable, -1 for each response of unacceptable, and 0 for each "not certain" response, and summing for each alternative, for each area. As might be expected, all three disposables rated high in the sanitation and ease of cleaning areas. The two types of trays were rated positive, on the average, regarding amount of space for food while the plates were rated near neutral, and the mess kit, negative. In the areas of ease of carrying when full of food and ease of eating something which must be cut, the two trays and plastic plates were rated on the positive side and the mess kit and paper plates were rated negative.

It seems quite evident from these results that a disposable tray is most acceptable and the present mess kit least acceptable — and results from a question asking the customers to pick the best and worst alternative overall leads to the same conclusion (Table 18). Plastic plates, paper plates, and the nondisposable tray, in that order, fell between the disposable tray and the mess kit in overall acceptability.

Based on these two surveys, it appears that the customers and the workers both prefer disposables over the present mess kit (although the workers were not asked about disposable trays). While the customers indicated some acceptance of a nondisposable tray, the workers preferred the mess kit to that alternative.

Thirty seven of the customers also evaluated three different types of utensils — the present mess kit utensils, dining facility utensils, and plastic utensils — in terms of acceptability in five areas including an overall evaluation. The response method (acceptable, unacceptable, and not certain) and scoring method (+1, -1, 0) was the same as for the mess kit alternatives. Table 19 indicates that in the areas of sanitation and ease of cleaning, the disposable plastic utensils were the only ones rated positive; and in the areas of size

TABLE 17
Acceptability of Alternatives to the Mess Kit for 44 Reforger Customers*

Area	Standard Mess Kit	Non-Dispos- able Tray	Disposables		
			Disposable Tray	Plastic Plates	Paper Plates
a. Sanitation	-18	-23	+33	+25	+34
b. Ease of cleaning	-20	-19	+30	+21	+30
c. Amount of space for food	-33	+13	+24	-7	+1
d. Ease of carrying when full of food	-12	+24	+22	+22	-13
e. Ease of eating something which must be cut e.g. steak	-7	+34	+19	+13	-18
Sum of a - e	-90	+29	+128	+74	+34

*Scores obtained by scoring +1 for each response of acceptable, -1 for each response of unacceptable, and 0 for each "not certain" response.

TABLE 18
Best and Worst Alternatives to the Mess Kit for 44 Reforger Customers

	Standard Mess Kit	Frequency of Response			
		Non-Dispos- able Tray	Disposable Tray	Plastic Plates	Paper Plates
Best Method	3	7	23	4	7
Worst Method	32	6	0	2	4

TABLE 19
ACCEPTABILITY OF FIELD UTENSIL ALTERNATIVES
FOR 37 REFORGER CUSTOMERS*

Area	Standard Mess Kit Utensils	Dining Facility Utensils	Plastic Utensils
a. Sanitation	-15	- 4	+25
b. Ease of cleaning	-15	- 2	+24
c. Size	- 5	+15	- 2
d. Ease of cutting (knife)	- 5	+28	-12
e. Overall acceptance	-10	+ 6	+14
Sum of a - d	-40	+37	+35

* Scores obtained by scoring +1 for each response of acceptable, -1 for each response of unacceptable, and 0 for each "not certain" response.

and ease of cutting with the knife, the dining facility utensils were the only ones rated positive. Clearly the present mess kit utensils were seen as the least desirable with no clear basis for determining whether plastic or dining facility utensils were the more preferred.

CONCLUSIONS AND RECOMMENDATIONS

1. The evaluation of field feeding equipment items can be broken down into three areas -- setting up, ease of operation, and safety.
2. The general opinion survey indicated that the setting up of the kitchen tent was neither easy nor hard -- while observation and the Fort Lee equipment survey indicated the kitchen tent as a problem.
3. The pieces of equipment or operations judged most difficult to operate, over all of the surveys/interviews, were cleaning the pots and pans, and the immersion heater.
4. In the safety area, the immersion heater stood out as the major concern in each survey/interview -- and also in the field observation and human factors analysis areas.
5. Field observation and the laboratory human factors analysis both were concerned with the pressure problem in the M-2 whereas the workers demonstrated little concern with the problem. A similar situation occurred with the readability of the M-2 pressure gauge. Nevertheless, the statistics concerning serious injuries and fatalities emphasize the need for implementation of such safety devices as a more readable gauge, an attached air pump, and an automatic pressure cut off. The opinion survey data would probably also indicate the phasing out of the M-1937 burner, if possible.
6. There was considerable agreement about the addition of equipment to the field kitchens, with refrigeration, something to keep food warm on the serving line, work tables and potwashing equipment being the most desirable items. Field observation indicated that units do bring non-TO&E equipment to the field in an attempt to solve these and other problems, or attempt to adopt/fabricate items from material available in the field.
7. Customers and workers both preferred disposables over the present mess kit, and customers suggested substitution of plastic or dining hall utensils for the standard mess kit utensils. The present mess kit and utensils received the lowest rating in all comparisons.
8. It is recommended that as many safety precautions as possible be implemented for both the M-2 burner and immersion heater.

9. It is further recommended that additional equipment requested by workers should be added in future tests/exercises and evaluated in terms of its contribution to the efficiency and/or quality of the system.

10. More detailed exploration of the suggested disposable alternatives to the standard metal mess kit is recommended — both in terms of survey efforts and operational testing.

11. Work should be initiated emphasizing human factors aspects of field food food equipment being operated in adverse temperature environments.

12. Finally, and most importantly, it is recommended that formal human factors analysis of all new food service equipment developed for use in the military services be strictly required.

THE FOOD SERVICE WORKER IN THE FIELD

This chapter deals with opinions of and about the Army and Marine food service worker in the field obtained from selected field exercises. Appendix H-1 shows the number of workers surveyed/interviewed on each exercise, by rank. Note that the Army personnel surveyed on the Reforger exercise in Germany appear to have held higher rank than their Marine counterparts at 29 Palms and Camp Lejeune.

In the study of Marine field feeding at Camp Lejeune, a preliminary worker opinion survey was administered to personnel dealing mainly with the comparison of garrison/mainside food service operations with field feeding operations. At 29 Palms (Marines) and in the Reforger '74 field exercises in Germany (Army) the revised, expanded worker survey/interview (Appendix A) was administered dealing with the comparison of garrison/mainside and field food service and job satisfaction. Also, in the Reforger exercise, the survey soliciting customer opinion of the food service worker in the field was given (Appendix A).

Worker Opinion of Field Food Service Overall. Opinion of the field feeding system as a whole was addressed in three questions asked of personnel in all three exercises surveyed in this project. A survey question was presented to workers asking them to compare their food service job in the field to their food service job in garrison/mainside on a five point Likert scale which ranged from "field much better than garrison/mainside" to "field much worse than garrison/mainside".

Table 20 shows differences in the opinions of the workers in the three exercises with the Lejeune personnel feeling that the field was "somewhat better" than mainside, the 29 Palms workers feeling that the field was "about the same" as mainside, and the Reforger food service people reporting that the field falls between being "about the same as garrison" and being "somewhat worse than garrison". Before drawing any conclusions about any apparent differences between the Marine and Army food service workers, however, several potential confounding factors should be mentioned. First, it should be asserted that these were only short exercises and that one or two weeks in the field is quite likely different from a sustained field effort. Secondly, the weather and environment differed markedly from exercise to exercise. The Camp LeJeune, North Carolina spring provided the most temperate environment as compared to the extremely hot desert at 29 Palms and the cold rain and mud in Germany. Nevertheless, particularly considering the adversity of some of the weather conditions, the response of the worker to the field feeding situation was more positive than anticipated.

As a matter of fact, an open ended interview question elicited responses concerning several aspects of the field food service milieu which the workers reported liking (Table 21). Note that workers in all three situations commented on there being "less hassle" than

TABLE 20
Worker Comparison of Field Food Service Job with Garrison/Mainside

	0 N/A*	Food Service Job—Frequency of Response					MEAN
		1 much worse in field	2 somewhat worse in field	3 about the same	4 somewhat better in field	5 much better in field	
Camp Lejeune	3	0	2	5	8	8	3.96
29 Palms	1	4	4	3	4	4	3.00
Reforger	3	9	13	9	2	4	2.43

*"Not applicable, I don't work in food service in garrison/mainside."

TABLE 21

Worker Likes of Field Food Service Job — Frequency of Response

Area	Likes			TOTAL
	Camp Lejeune	29 Palms	Reforger	
a. Less hassle	5	4	4	13
b. The outdoors	5	3	5	13
c. Troop's appreciation	1	3	1	5
d. More on own	0	3	1	4
e. Challenge of job	0	4	0	4
f. Co-workers	2	0	1	3
g. More relaxed	1	0	2	3
h. Everything	0	0	3	3
i. Nothing, not much	0	5	13	18

in garrison/mainside. As a matter of fact, note that there were additional comments made by the workers about the troops being appreciative, and the workers feeling more relaxed and on their own in the field. A case could be made for summing all of these responses under a general category of "a more relaxed atmosphere with less harassment" -- making this category the strongest reported positive aspect of the field situation. Thirteen individuals also reported liking the feeling of being outdoors in the field. Other positive factors cited were co-workers, the challenge of the job, and "everything". Note that most of these comments were made by workers in all three exercises.

Eighteen workers reported liking nothing or not much about the field, and another interview question about dislikes in the field followed up such comments. The two major complaints about the field concerned the long hours and the weather (Table 22), with personnel in all three exercises complaining about the hours, and workers at 29 Palms and Reforger complaining about the weather. Also note that six cooks in Reforger specifically mentioned the mud as an additional complaint.

Nine of the Reforger workers complained about the difficulty of moving from site to site as the troops moved. Since the Marines were not required to move their field kitchens in their two operations, they had no occasion to experience any discontent in this area. Other dislikes registered to a lesser extent included being away from family, bad equipment, too few workers (29 Palms mostly), disorganization, bugs and snakes (mostly Lejeune), harassment by supervisors (mostly Reforger) and sanitation.

An additional series of five point Likert scale questions concerning several aspects of the field feeding situation was asked of the workers at 29 Palms and in Reforger, and responses tended to agree with the likes and dislikes expressed in the interview questions discussed above. Long working hours was by far the biggest complaint followed by the working environment and the difficulty of moving (Table 23). All of the rest of the categories were scored on the positive side of neutral with two categories, how good is the average meal, and how easy is it for the customer to obtain his meal, rated between "fairly good" and "very good". Responses to the rest of the categories: how easy to set up to cook, how good is the equipment, how easy to clean up after cooking, amount of equipment, customer attitude, how sanitary is the kitchen, and how easy is it to prepare a meal -- arrayed themselves in the above order between "neither bad nor good" and "fairly good". One category in the survey, how good is the raw food, is omitted here since several workers apparently responded to this question in terms of how much they liked to eat raw food.

Job Satisfaction in the Field. Another view of the attitude of the worker in the field can be obtained by assessing some aspects of job satisfaction. Two scales from the Job Description Index (JDI), (Smith, et al, 1969), were used to measure satisfaction with the work itself and the supervision at 29 Palms and in Reforger. Each area is evaluated

TABLE 22

Worker Dislikes of Field Food Service Job -- Frequency of Response

Area	Dislikes			TOTAL
	Camp Lejeune	29 Palms	Reforger	
a. Long hours	6	13	9	28
b. Weather (hot, cold, rain)	1	8	16	25
c. Moving	0	0	9	9
d. Away from family	4	0	3	7
e. Too few workers	0	6	1	7
f. Bad equipment	4	1	2	7
g. Mud	0	0	6	6
h. Disorganization	1	4	1	6
i. Bugs and snakes	4	0	1	5
j. Supervisor harassment	1	0	4	5
k. Sanitation	3	0	1	4

TABLE 23

Worker Opinion of Several Aspects of the
Field Food Service Situation

	Scale				
	1 Very bad	2 Somewhat bad	3 Neither bad nor good	4 Fairly good	5 Very good
Area			29 Palms	Reforger	MEAN
a. Working hours			1.55	1.82	1.68
b. Working environment			2.25	2.88	2.56
c. How easy to move			2.45	2.70	2.58
d. How easy to set up			3.60	3.06	3.34
e. How good is equipment			3.15	3.58	3.36
f. How easy to clean up			3.60	3.38	3.50
g. Amount of equipment			3.28	3.70	3.50
h. Customer attitude			3.20	3.86	3.53
i. How sanitary is kitchen			3.89	3.65	3.77
j. How easy to prepare meal			3.95	3.85	3.90
k. How good is average meal			4.32	4.23	4.28
l. How easy for customer to obtain meal			4.32	4.40	4.36

by responses to a list of eighteen words or descriptive phrases. Table 24 shows the format and form of the adjectives from the work scale. A respondent circles "Y" (yes) if he thinks an item describes his job, "N" (No) if he feels it doesn't, or "?" if he cannot decide or doesn't understand the item. Based on several respondents who were asked to describe the best and worst possible jobs for themselves, the developers of the JDI determined which response should be scored as satisfied for each item. For example, in Table 24, "fascinating" and "good" are scored in the satisfied direction if the individual responds yes; and "routine" and "boring" are scored in the satisfied direction if the individual responds no. Satisfied answers are scored as 3, dissatisfied answers as 0, and "?" answers as 1 for a range of possible scores for each scale of from 0-54.

Table 25 shows the mean responses obtained at 29 Palms, Reforger, from a sample of military food service workers at Travis, Minot, and Homestead Air Force Bases (Symington and Meiselman, 1975), and from a large, non-food service civilian sample (Smith, et al, 1969). As was the case in the Air Force sample, satisfaction with supervision was higher than satisfaction with work at both 29 Palms and Reforger. JDI mean scores for satisfaction with supervision in both exercises were approximately the same as those for both the Air Force garrison sample and Smith's normative sample. Satisfaction with the work itself in the field samples was similar to the Air Force garrison group -- with all three of the military worker groups scoring at least ten points lower than the normative sample. These results tend to support the notion that the field food service job was not perceived as being worse, on the average, than the garrison/mainside food service job. However, comparison of the scores on the JDI satisfaction with work scale with the normative scores for the same scale would indicate that some attention might be fruitfully paid to the enrichment of the food service job for both the field and garrison/mainside worker.

Customer Opinion of the Food Service Worker in the Field. During the Army Reforger exercise a short, two question survey was administered to 43 customers concerning their opinion about the food service workers in the field. The first question, phrased in a standard semantic differential format with five response alternatives between two opposite adjectives (Osgood, et al., 1957), dealt with five different characteristics of the field workers. Table 26, indicates that the customers, on the average, rated all five characteristics on the positive side of neutral. This positive trend is in apparent opposition to responses to a similar question posed to customers at Fort Lee in another survey which indicated below average ratings of the attitudes and abilities of the garrison food service workers at Fort Lee (Branch, et al., 1974a). Customers judged the food service workers to be moderately hard working, on the average (16 of the 43 respondents felt that the workers were very hard working). Workers were also rated, on the average, as between moderately positive and neutral on a five point scale in providing fast service, being well trained, being clean, and being pleasant.

TABLE 24

Format for the Work Scale of the Job Description Index
(JDI)

WORK

Fascinating	Y	N	?
Routine	Y	N	?
Boring	Y	N	?
Good	Y	N	?

Instructions: Circle the Y (yes) if an item describes your job, N (no) if it doesn't describe your job, and ? if you cannot decide.

TABLE 25

Mean Responses to the JDI at 29 Palms, Reforger,
Three Air Force Bases, and in a Normative Sample

Scale	29 Palms	Reforger	Air Force	Norm
Work	21.90	26.20	23.72	36.57
Supervision	41.05	38.15	38.89	41.10

Potential scores ranged from 0 (low satisfaction) to 54 (high satisfaction).

TABLE 26

Customer Opinion of the Field Kitchen Worker in the Reforger
Exercise — Frequency of Response

Area	+2 Very	+1 Moderately	0 Neutral	-1 Moderately	-2 Very	Area	MEAN
Hard working	16	18	6	1	2	Not hard working	+1.05
Provide fast service	12	19	6	4	2	Provide slow service	+0.81
Well trained	8	17	10	7	0	Poorly trained	+0.62
Clean	8	19	7	7	2	Dirty	+0.56
Pleasant	7	13	10	8	2	Unpleasant	+0.38

Another question, constructed in the five point Likert scale format, addressed whether workers performed better in the field or garrison/maininside in the same five areas. As can be seen in Table 27, all of the ratings centered around the "about the same" point on the scale with the exception of the feeling that the cleanliness of the workers, on the average, was between "about the same" and "a little worse" in the field.

It is interesting to note the similarity between this positive attitude on the part of the customer and the previously reported positive opinion the field food service worker has of the field customer. In all garrison situations these laboratories have tested, the customers tended to be critical of the attitudes and abilities of the food service workers, and the workers were disturbed by the attitude of the customers.

CONCLUSIONS AND RECOMMENDATIONS

1. The Marine food service workers rated their jobs in the field about the same as maininside or better, on the average. Reforger personnel rated their jobs as worse than in garrison. Part of this discontent might be explained by noting the latter group's expressed negative feelings about the weather during their exercises or the mobility requirements of the exercise.

2. Job satisfaction scores indicate that the field workers were, on the average, as satisfied with the supervision and the work itself as their Air Force garrison contemporaries — although less satisfied with the work than a normative sample.

3. The main positive aspects of field feeding reported in the interviews by the workers were a more relaxed atmosphere with less harassment and the enjoyment of being outdoors.

4. The major negative aspects of field feeding, reported in both surveys and interviews, were the long hours, followed by discontent with the weather and the requirement to move the kitchens.

5. The customers, in the Reforger exercise, in general, expressed a positive reaction concerning the attitude and ability of the food service workers in the field.

6. It is recommended that reasonable and workable solutions to the problems of long work hours be found.

7. The mutual respect apparently existing between the worker and customer in the field should be investigated in more detail in an attempt to obtain ideas for improving the same relationship in garrison.

8. Finally, any proposed study of change in the field feeding system should include provision for the assessment of worker attitude.

TABLE 27

Customer Comparison of Food Service Workers
in the Field and in Garrison — Frequency of Response

Area	5 Much better in field	4 Little better in field	3 About the same in field	2 Little worse in field	1 Much worse in field	MEAN
Hard working?	6	6	23	5	1	3.27
Well trained?	3	6	24	7	0	3.12
Fast service?	3	8	16	12	2	2.95
Pleasant?	2	9	14	14	1	2.92
Clean?	1	6	10	17	7	2.44

Different N'S indicate blanks on some surveys.

SALIENCE ANALYSIS

The purpose of this analysis was to determine which aspects of feeding situations in garrison and in the field, military personnel find most important. In order to do this, a four section questionnaire was developed dealing with eight aspects of the feeding situation: 1) Quality of Food, 2) Variety of Food, 3) Speed of Service, 4) Quantity of Food, 5) Choice of Eating Companions, 6) Seasoning of Food, 7) Arrangement of the Dining Facility, 8) Neatness, Cleanliness and Sanitation of the Eating Area. The respondent was instructed to estimate two different things:

1) Agreement with eight different statements, pertaining to eight aspects of feeding situations (e.g., the quantity of food, the speed of service, etc.). For this part of the questionnaire, the respondent was provided with a category scale ranging from 0 (disagree extremely) to 8 (agree extremely) with Part 1 of the questionnaire instructing him to describe field feeding, and Part 3, garrison feeding. The Appendix contains the final version of the survey.

2) Estimation of the importance of each aspect of the feeding situation. For this part of the questionnaire, the respondent was provided with a category scale ranging from 0 (not at all important) to 5 (extremely important) with Part 2 of the questionnaire instructing him to rate field feeding aspects, and Part 4 garrison feeding aspects.

A pilot study of the questionnaire was given to 43 respondents at Camp LeJeune, North Carolina in May 1974. The pilot questionnaire was similar to the final questionnaire, except that all of the comparisons (field feeding vs. garrison feeding, evaluative rating vs importance rating) were presented on one side of the answer sheet. An analysis of the ratings obtained from the pilot study indicated that there was virtually no difference between ratings of the garrison and the field feeding situations. This lack of difference may have been due to either: a) a true lack of difference between the feeding system, or b) the tendency of respondents to repeat their answers when describing field and garrison feeding systems on the same sheet. In order to guard against the latter possibility, the questionnaire format was changed, so that the field feeding system was rated on one side of sheet, and the garrison feeding system was rated on the other side.

Two groups were polled with the modified questionnaire. One group comprised 93 Marines on exercise at 29 Palms, and the second group comprised 66 Army troops on exercise in Germany. The mean ratings and the standard error of the mean ratings were computed for each group separately.

Descriptions of Garrison and Field Feeding. Figures 1 and 2 show a comparison of the descriptions of garrison and field feeding systems, as is (with the 0-8 scale of agreement). Figure 1 shows the mean ratings from Marines stationed at 29 Palms, whereas Figure 2 shows the ratings obtained from Army troops in Germany.

FIGURE 1
Description of Garrison and Field Feeding Systems - 29 Palms

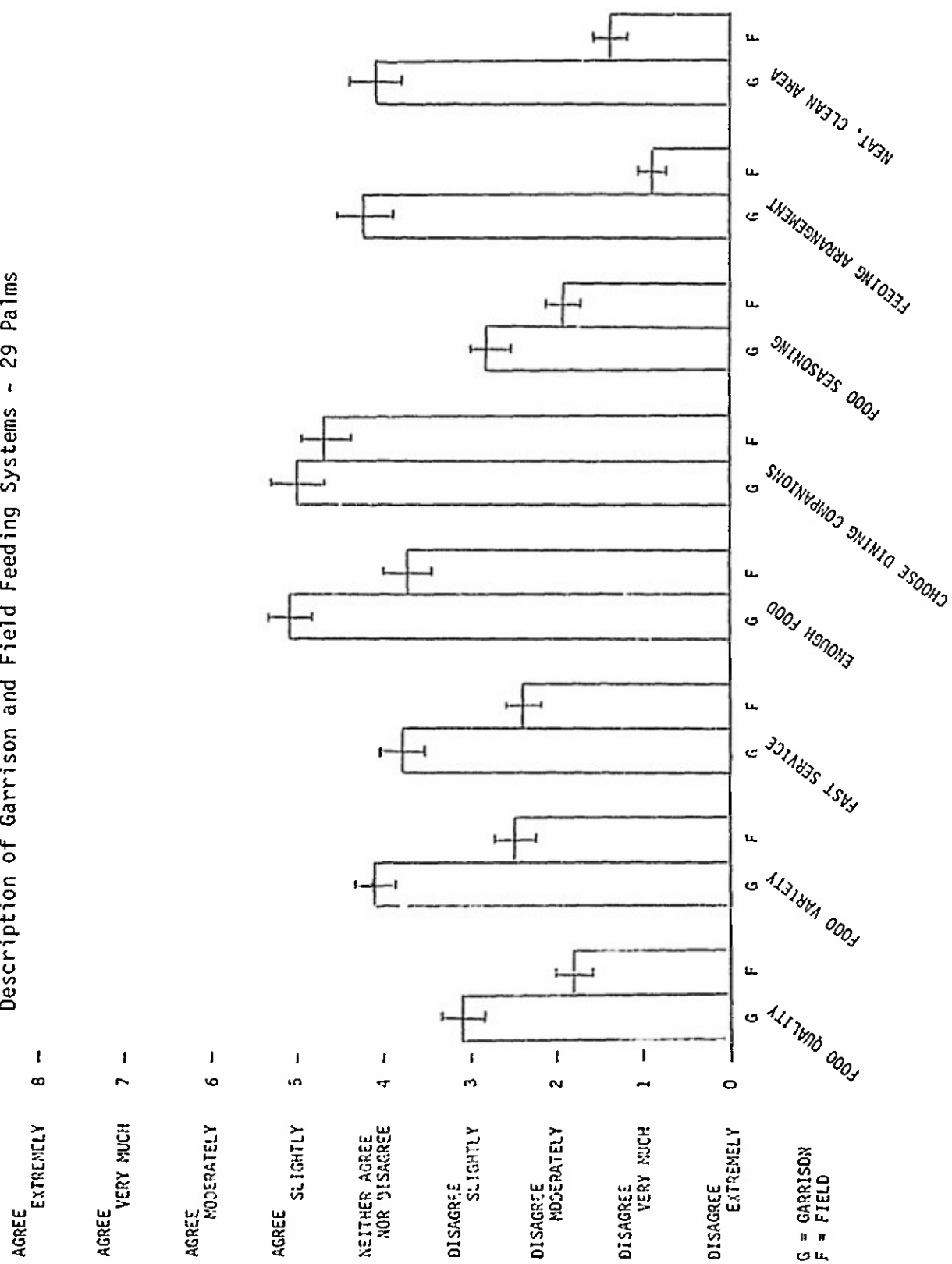
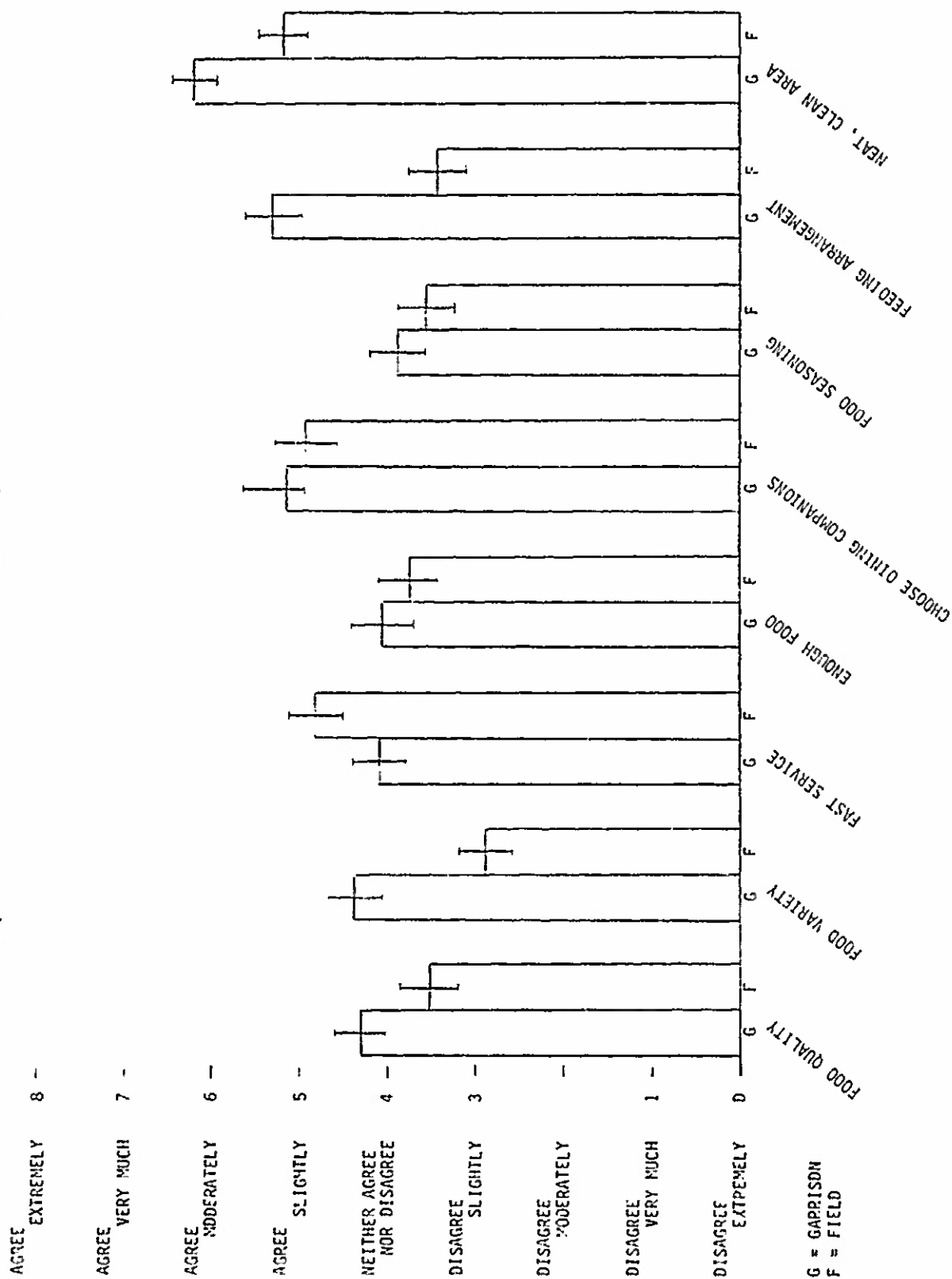


FIGURE 2
Description of Garrison and Field Feeding Systems - Germany



Figures 3 and 4 show a comparison of the importance ratings for the garrison and field feeding systems. Figure 3 refers to the mean ratings from 29 Palms, whereas Figure 4 refers to the mean ratings from respondents in Germany.

Table 28 ranks the questions describing the systems according to the feeding systems and the sites.

For garrison feeding, Food Seasoning ranked least acceptable in both 29 Palms and Germany. For field feeding, Food Variety was ranked least acceptable in 29 Palms. The most acceptable aspect in Germany, for both field and garrison feeding ratings was the eating area. This is unusual considering the difficulty of eating outdoors in the cold, rainy weather. The most acceptable aspect in 29 Palms was Food Quantity in garrison and field ratings; for the latter, Food Quantity was tied with Choice of Dining Companions. Considering all the data, Choice of Dining Companions ranks as an acceptable aspect of both field and garrison dining situations. Ratings of some aspects appear to be more tied to testing locale. Food Quantity was rated very acceptable in 29 Palms, but ranked 4th and 7th in Germany ratings of garrison and field respectively. Conversely, Eating Area was rated most acceptable in Germany, and rated 5th and 7th in 29 Palms, garrison and field respectively. Two aspects were not highly acceptable in either test site or in either field or garrison situations; Food Quality and Food Seasoning.

In addition to these differences in the two feeding systems (from one site to the other, and from one system to the other in the same site) there was a difference between the sizes of the ratings provided by the respondents in the two sites. The soldiers in Germany usually gave higher ratings than the Marines at 29 Palms. Whether this difference reflects a true difference in the respondent's perception of the feeding situation, or whether it is a problem of using the scales differently is not easily answered. However, since the ratings for the German feeding system and the 29 Palms feeding system were not highly correlated both factors would seem implicated; i.e., although the two groups used different parts of the rating scale, they also perceived their respective feeding situations differently.

Non parametric statistical tests were run on both the descriptions of the system and on the importance ratings. The following results were obtained, using the Spearman rank correlation coefficient (ρ), a non parametric measure of relationship between the rank order of ratings for two different groups rating the same set of aspects.

FIGURE 3
Importance Ratings for Garrison
and Field Feeding Systems - 29 Palms

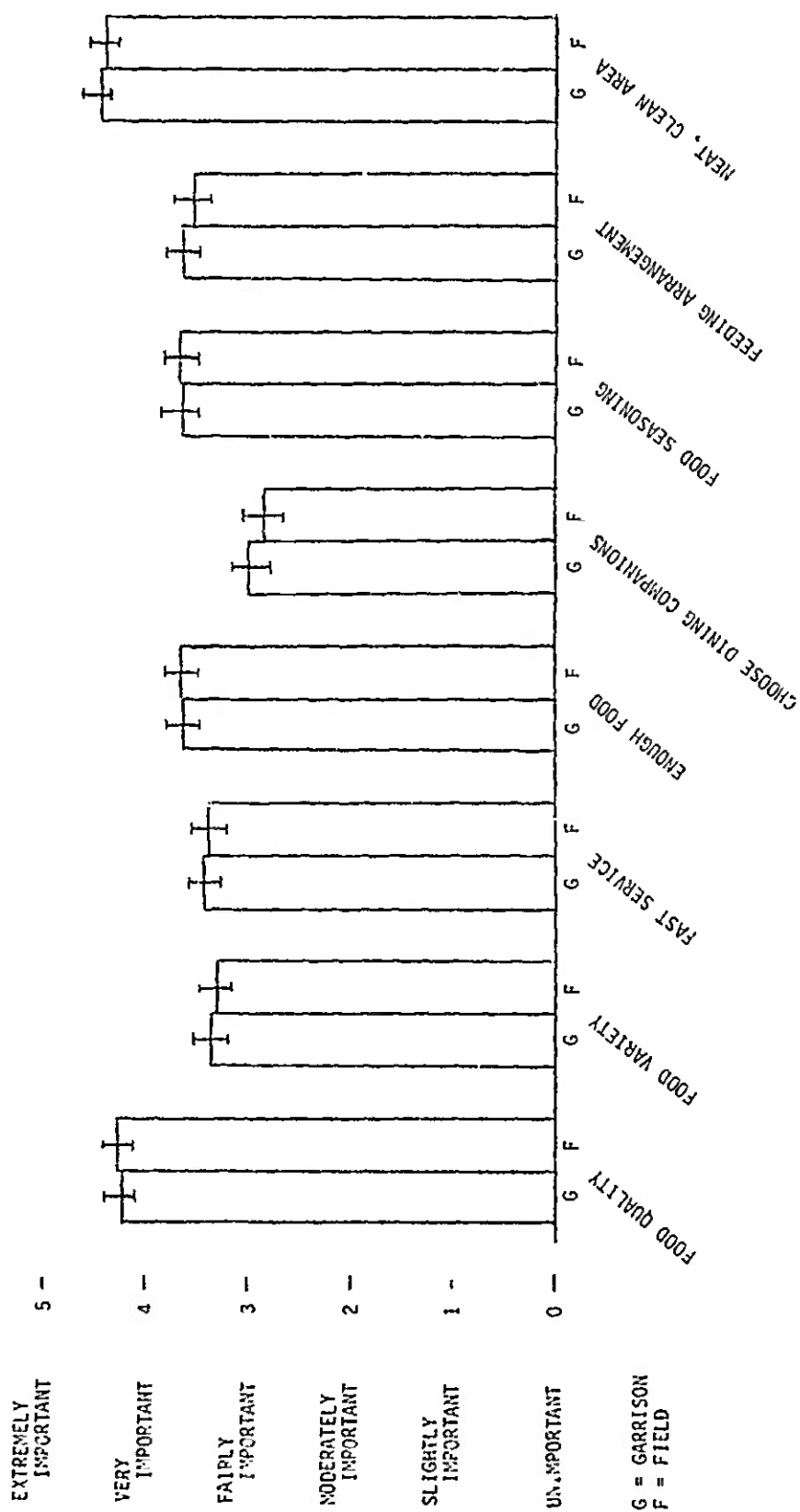


FIGURE 4
Importance Ratings for Garrison
and Field Feeding Systems - Germany

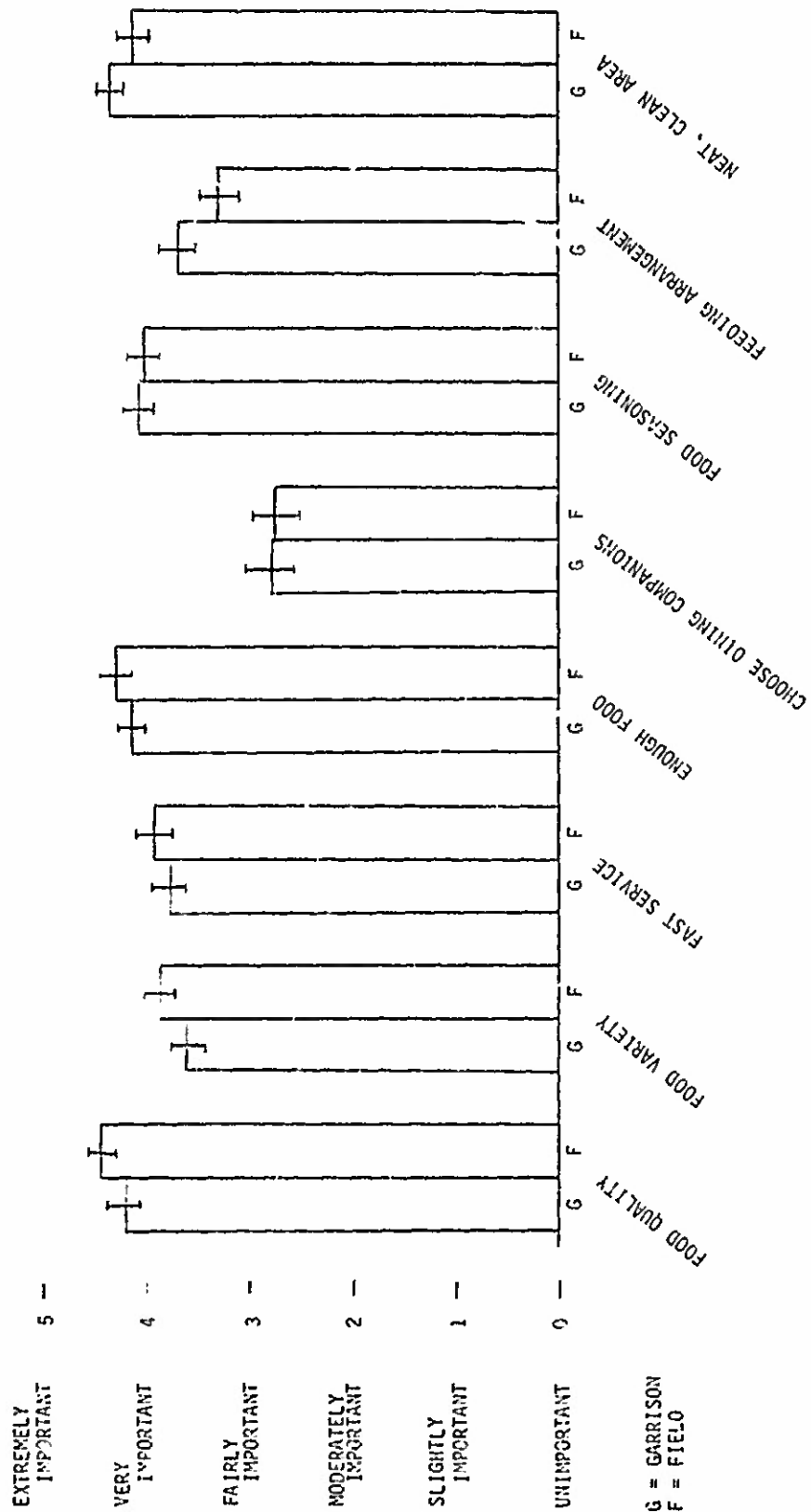


TABLE 28

Rank Order of Descriptions of Feeding Systems by Feeding
System and Site

	GERMANY		29 PALMS	
	Garrison	Field	Garrison	Field
Food Quantity	7	4	1	1.5
Dining Arrangement	2	7	3	8
Eating Area	1	1	5	7
Food Variety	4	8	4	3
Food Quality	5	5.5	7	6
Speed of Service	6	3	6	4
Seasoning in Food	8	5.5	8	5
Choice of Dining Companions	3	2	2	1.5

- 1) correlation of garrison and field descriptions (29 Palms data), $\rho = 0.45$
- 2) correlation of garrison and field descriptions (Germany data), $\rho = 0.21$
- 3) correlation of Germany and 29 Palms descriptions (garrison data), $\rho = 0.30$
- 4) correlation of Germany and 29 Palms descriptions (field data), $\rho = 0.18$

These correlations indicate that the respondents describe the two feeding situations differently for each test site, and that for the same feeding system the two sites do not covary. High agreement on a question for field feeding in 29 Palms may not necessarily predict a high agreement for the same question for garrison feeding in 29 Palms, or for field feeding in Germany. Each site and feeding system is described uniquely.

Importance Ratings of Feeding Systems. Knowledge of the systems as is, obtained by the agreement scale above is not the sole information necessary for the analysis of feeding systems. The respondent may pay more attention to some aspects of the feeding system than to others. Although one aspect could be very unacceptable by itself (e.g., the decor), nonetheless, this attribute might have very little weight (importance) to the respondent when he integrates all of the aspects of a feeding system together to arrive at a single judgment of how good or bad the system appears to him. Decisions about what aspects to change must account for what might be problems, and their importance to the respondent.

Figures 3 and 4 show the importance rating for each of the eight aspects of the feeding system, also with the standard error of the mean drawn to show the variation in the judgments. In contrast to the variation described above between descriptions of field and garrison feeding, the importance factors are almost always identical for each aspect of the system, for a single site, when garrison and field feeding are compared. That is to say, when the respondents were polled about the importance of attributes, such as food quality, the change in the system from garrison to field, did not markedly change the importance rating given to that aspect. A rank order of the attributes is shown in Table 29.

There are a sufficiently large number of tied ranks so that one can assume that there are no substantial differences between the two test sites in terms of the rank order of importances given to the eight aspects of the feeding system. However, the respondents in Germany used higher numbers on the importance scale than did the respondents at 29 Palms. This increased the importance ratings, but did not dramatically alter the ranking of the aspects.

TABLE 29

Ranks of Importance of Attributes. Attributes of feeding situations which are equally important are assigned the same numbers.

	GERMANY (Garrison & Field Pooled)	29 PALMS (Garrison & Field Pooled)
Food Quality	1	1
Food Variety	3	3
Speed of Service	3	2
Food Quantity	1	2
Choice of Dining Companions	3	3
Food Seasoning	1	2
Dining Arrangement	2	2
Eating Area	1	1

Salience in Field and Garrison Feeding. By themselves, the descriptions of the aspects for the two feeding systems and the ratings of the importances attached to those aspects do not allow the user of this information to determine what are the optimal changes to make in order to improve the feeding system. However, by combining the two ratings, one can identify those problem areas by the numerical values of these combinations.

In order to develop a weighted set of descriptors, whose size is an indication of the degree to which an aspect is important and must be improved, the ratings that described the feeding systems were reversed, so that high ratings indicated a problem aspect. This was done by subtracting the mean ratings in the description part from 8, to produce a reversed scale, in which 0 stands for a lack of problems (i.e., the respondent agrees that the system is performing adequately), whereas an 8 stands for the greatest problem. Therefore, the more important an aspect appeared to be, the higher should be its importance rating.

A salience value was computed, by obtaining the product:

(New Description = 8 - Old Description) X (Importance Factor for Aspect)

Each aspect produced its own salience value. Low salience values imply that either a) the aspect is good and needs no improvement, or b) the aspect is poor, but the respondent attributes little importance to that aspect. A high salience value is a clue to a potential problem, since the importance factor and the problem description work towards increasing the product.

Table 30 provides the products, as well as the rank orders of the products (in parentheses).

The following problem areas can be isolated from these salience values:

- 1) Food seasoning is a consistent problem, and is highly salient to the respondent.
- 2) Other aspects vary between test sites or between feeding systems (field or garrison). Food quality is salient based on garrison and field data from Germany and based on garrison data from 29 Palms but not from field data from 29 Palms, possibly reflecting the opinions of Marine Reserve personnel. Food Quantity is salient in Germany but not as much in the 29 Palms results. Dining area salience is high in 29 Palms but not in Germany. Choice of Dining Companions was low in relative salience for both test sites and both feeding systems. Consistently moderate salience values were obtained for Speed of Service.

TABLE 30

Salience of Field Feeding and Garrison Feeding Attributes
 Obtained by Multiplying Description and Importance.
 Rank Shown in Parentheses.

	GERMANY		29 PALMS	
	A Garrison	8 Field	C Garrison	D Field
Food Quality	15.5 (6)	19.8 (7.5)	20.9 (8)	7.7 (2)
Food Variety	13.1 (4)	19.8 (7.5)	14.4 (5)	8.3 (3)
Speed of Service	14.6 (5)	12.2 (3)	11.1 (3)	19.0 (5)
Food Quantity	16.4 (7)	18.1 (5.5)	10.4 (2)	11.7 (4)
Choice of Dining Companions	2.9 (1)	7.9 (1)	9.0 (1)	6.4 (1)
Food Seasoning	17.2 (8)	18.2 (5.5)	18.9 (7)	22.3 (6)
Decor	10.2 (3)	14.3 (4)	13.5 (4)	25.6 (7)
Sanitation	7.8 (2)	11.3 (2)	17.2 (6)	29.0 (8)

Spearman rho:

A-8 = .33, C-D = .26, A-C = .38, A-D = -.21

3) Overall, the two sites did not differ significantly in the level of the salience values. A sign test showed that for garrison feeding neither site had more problems than the other. A similar sign test showed the same results for field feeding, when the two sites were compared.

A comparison of garrison and field feeding situations by the sign test revealed that for Germany, the field feeding situation was rated as having significantly more problems than garrison feeding, and that for 29 Palms, in contrast, the two feeding situations do not differ significantly in the number of problems.

Finally, Spearman rho statistics were computed (see Table 30) between the two sites, and between the two feeding systems. All saliences were moderately correlated (maximum rho value = 0.38 for the relation between garrison feeding in Germany and in 29 Palms, minimum rho value = -0.21 for the relation between field feeding in Germany and in 29 Palms). These correlations indicate that problem areas to be solved seem to be more consistent in garrison feeding systems. For field feeding systems problems may be much more unique to the site.

CONCLUSIONS AND RECOMMENDATIONS

1. Food variety and dining arrangement were rated the least acceptable aspects of field feeding, and eating area and food quantity most acceptable in Germany and 29 Palms respectively.

2. Both food quality and food seasoning were unacceptable in both test sites (29 Palms and Germany) and in both garrison and field data.

3. When respondents rated which aspects of feeding were important to them there were no differences between garrison and field feeding.

4. Food quality and eating area received the highest importance rank in both test sites. Food quantity and food seasoning also ranked high in Germany.

5. The salience of each factor was determined by combining the evaluative rating and the importance rating. The most salient aspects of field feeding were: food quality, food quantity, and dining area. Differences in salience of factors between test sites (Germany, 29 Palms) and feeding systems (field, garrison) were observed.

6. These data confirm the importance of food variables (quality, quantity, seasoning) in food systems and suggest that food seasoning needs special attention as a factor affecting troop opinion in the field.

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APPENDIX A1

NATICK LABORATORIES 1974

FOOD LIKES AND DISLIKES IN THE FIELD

As part of our study of field feeding, we need information on what foods personnel want added or removed from the menus. In the four blocks below please indicate what specific menu items you want added or removed from food served in the field, both C rations and A or B rations. Remember that C rations are packaged for field use by individual personnel; A and B rations are prepared from scratch by cooks. List as many items as apply. Try to list items in each block or as many blocks as possible.

	ADD TO THE MENU	REMOVE FROM THE MENU
C RATION		
A, B RATION		

APPENDIX A2

NATICK LABORATORIES 1974

FOOD QUESTIONNAIRE

Listed below are 7 GENERAL TOPICS OF CONCERN. For each topic, check whether it is Very Bad, Bad, Neither Bad nor Good, Good or Very Good, for your immediate dining situation in your opinion.

Area or Topic	Very Good	Good	Neither Good Nor Bad	Bad	Very Bad
A. General eating area	_____	_____	_____	_____	_____
B. Meal hours	_____	_____	_____	_____	_____
C. Monotony of same eating area	_____	_____	_____	_____	_____
D. Quality of food	_____	_____	_____	_____	_____
E. Quantity of food	_____	_____	_____	_____	_____
F. Service by mess personnel	_____	_____	_____	_____	_____
G. Variety of the food	_____	_____	_____	_____	_____

APPENDIX A2 (cont.)

How do you feel about the size of serving you are now getting?

We need:	Much More	Some More	O.K. As Is	Some Less	Much Less
a. Meats:	_____	_____	_____	_____	_____
b. Casseroles:	_____	_____	_____	_____	_____
c. Starches:	_____	_____	_____	_____	_____
d. Vegetables:	_____	_____	_____	_____	_____
e. Salads:	_____	_____	_____	_____	_____
f. Beverages:	_____	_____	_____	_____	_____
g. Desserts:	_____	_____	_____	_____	_____
h. Breads:	_____	_____	_____	_____	_____
i. Fruits:	_____	_____	_____	_____	_____
j. Soups:	_____	_____	_____	_____	_____

APPENDIX A2 (cont.)

How do you feel about the size of serving you want in the field compared to garrison?

We want:	Much More in Field	More in Field	Same	Less in Field	Much Less in Field
a. Meats	_____	_____	_____	_____	_____
b. Casseroles	_____	_____	_____	_____	_____
c. Starches	_____	_____	_____	_____	_____
d. Vegetables	_____	_____	_____	_____	_____
e. Salads	_____	_____	_____	_____	_____
f. Beverages	_____	_____	_____	_____	_____
g. Desserts	_____	_____	_____	_____	_____
h. Breads	_____	_____	_____	_____	_____
i. Fruits	_____	_____	_____	_____	_____
j. Soups	_____	_____	_____	_____	_____

APPENDIX A2 (cont.)

You have just answered questions about GENERAL CLASSES OF FOODS. For the situation in which you are now eating, list any SPECIFIC food items within those GENERAL CLASSES which you STRONGLY feel should be served in LARGER QUANTITY during a meal. If none, write "NONE". Also, for each item you list indicate by how much the size of a serving should be increased (e.g. two times, three times, four times, etc.).

Increase in Serving Size				
Foods	Two Times	Three Times	Four Times	Five Times or More
a. _____	_____	_____	_____	_____
b. _____	_____	_____	_____	_____
c. _____	_____	_____	_____	_____
d. _____	_____	_____	_____	_____
e. _____	_____	_____	_____	_____

For the situation in which you are now eating, list any SPECIFIC food items which you STRONGLY feel should be served MORE OFTEN. If none, write "NONE". Also, indicate about how many servings of each food you are NOW receiving in a week, and how many servings you would LIKE to receive in a week.

	Number of servings now received in a week	Number of servings you would like to receive in a week
a. _____	_____	_____
b. _____	_____	_____
c. _____	_____	_____
d. _____	_____	_____
e. _____	_____	_____
f. _____	_____	_____
g. _____	_____	_____
h. _____	_____	_____
i. _____	_____	_____
j. _____	_____	_____

APPENDIX A3

Food Questionnaire

Natick Laboratories 1974

No.	Did you get enough food at your meals yesterday?		Do you get hungry between meals?		Can you go back for seconds?		Do you go back for seconds?		Why not?
	YES	NO	YES	NO	YES	NO	YES	NO	
1.									
2.									
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									

FOOD SELECTION DATA SHEET

11	12	13	
Page			

Op. No. 10

Meal	8	
Line	9	1

4	5	6	7

Time

Julian Date	1	2	3
----------------	---	---	---

1	15	16	17
18	19	20	21
22	23	24	25
26	27	28	29
30	31	32	33
34	35	36	37
38	39	40	41
42	43	44	45

APPENDIX A5

NATICK LABORATORIES 1974

Field Kitchen Worker Opinion

For each pair of items below, please indicate your opinion of the *workers* in the *field kitchen* by checking the item which comes closest to describing your feelings.

FOR EXAMPLE: If you feel the workers are moderately young, your answer would be

	Very	Moder- ately	Neutral	Moder- ately	Very	
Old	_____	_____	_____	<u> X </u>	_____	Young
* * * * *						
	Very	Moder- ately	Neutral	Moder- ately	Very	
Clean	_____	_____	_____	_____	_____	Dirty
Unpleasant	_____	_____	_____	_____	_____	Pleasant
Poorly Trained	_____	_____	_____	_____	_____	Well Trained
Hard Working	_____	_____	_____	_____	_____	Not Hard Working
Provide Fast Service	_____	_____	_____	_____	_____	Provide Slow Service

For each of the following areas, please rate the *workers* in the *field kitchen* as compared to garrison or mainside food service workers.

	Much Better in Field	Little Better in Field	About Same in Field	Little Worse in Field	Much Worse in Field
Clean?	_____	_____	_____	_____	_____
Pleasant?	_____	_____	_____	_____	_____
Well trained?	_____	_____	_____	_____	_____
Hard working?	_____	_____	_____	_____	_____
Fast service?	_____	_____	_____	_____	_____
* * * * *					

APPENDIX A5 (cont.)

Overall, how do *meals* from the *field kitchen* compare to meals in garrison or mainside?

_____ I don't know, I don't eat in the dining hall in garrison or mainside.

Much
Better
in Field

Little
Better
in Field

About
Same
in Field

Little
Worse
in Field

Much
Worse
in Field

APPENDIX A6

NATICK LABORATORIES 1974

Food Service Worker — Field

The purpose of this survey is to find out how you feel about some of the conditions of your food service job — particularly in the field. Please answer each question CAREFULLY and HONESTLY.

1. Rank _____

2. Approximately how long have you spent working in food service in the field before this exercise? (Please type an answer for both categories below — On exercises or school operations and In the combat zone.)

On exercise or school operations: _____ Years _____ Months _____ Days

In combat zone: _____ Years _____ Months _____ Days

3. What do you do in your field food service job? (Be specific)

4. Please check the item which best describes how much you like military service.

Dislike very much	Dislike moder- ately	Dislike a little	Neither like nor dislike	Like a little	Like moder- ately	Like very much
_____	_____	_____	_____	_____	_____	_____

5. Would you like to transfer to duties other than food service?

Yes No

6. Overall, how would you rate your food service job in the field compared with your food service job when you are in garrison or mainside?
(Please check one.)

- _____ Much better than in garrison or mainside
- _____ Somewhat better than in garrison or mainside
- _____ About the same as in garrison or mainside
- _____ Somewhat worse than in garrison or mainside
- _____ Much worse than in garrison or mainside
- _____ Not applicable, I don't work in food service in garrison or mainside

APPENDIX A6 (cont.)

7. Please rate the following general areas of concern (a - m) as they apply to your food service job in the field. (Please indicate whether each of the areas is very bad, fairly bad, neither bad nor good, fairly good, or very good in your field food service job, in your opinion.)

Area	Very Bad	Fairly Bad	Neither Bad Nor Good	Fairly Good	Very Good
a. How easy to set up before cooking:	_____	_____	_____	_____	_____
b. How easy to clean up after cooking:	_____	_____	_____	_____	_____
c. How easy to prepare to move:	_____	_____	_____	_____	_____
d. How easy for customer to obtain his meal:	_____	_____	_____	_____	_____
e. How good is equipment:	_____	_____	_____	_____	_____
f. Amount of equipment:	_____	_____	_____	_____	_____
g. How sanitary is the kitchen:	_____	_____	_____	_____	_____
h. How easy to prepare meal:	_____	_____	_____	_____	_____
i. How good is average meal:	_____	_____	_____	_____	_____
j. How good is the raw food:	_____	_____	_____	_____	_____
k. Attitude of customers:	_____	_____	_____	_____	_____
l. Working hours:	_____	_____	_____	_____	_____
m. Working environment:	_____	_____	_____	_____	_____

8. Please rate each of the following items in regard to HOW EASY it is to set up. If you have never used a particular item, check the column headed *never used* next to that item.

APPENDIX A6 (cont.)

Item	Very Easy	Fairly Easy	Neither Easy nor Hard	Fairly Hard	Very Hard	Never Used
a. Mess kit laundry line:	_____	_____	_____	_____	_____	_____
b. Serving line:	_____	_____	_____	_____	_____	_____
c. Kitchen tent:	_____	_____	_____	_____	_____	_____

9. Please rate each of the following items in regard to HOW EASY it is to OPERATE. If you have never used a particular item, check the column headed *Never Used* next to that item.

Item	Very Easy	Fairly Easy	Neither Easy nor Hard	Fairly Hard	Very Hard	Never Used
a. M-1937 range:	_____	_____	_____	_____	_____	_____
b. M-1959 range:	_____	_____	_____	_____	_____	_____
c. M-1937 burner:	_____	_____	_____	_____	_____	_____
d. M-2 burner:	_____	_____	_____	_____	_____	_____
e. Immersion heater:	_____	_____	_____	_____	_____	_____
f. Pot cleaning:	_____	_____	_____	_____	_____	_____

10. Please rate each of the following pieces of equipment or operations in regard to HOW DANGEROUS each is. Again, check *Never Used* if appropriate.

Item	Very Unsafe	Fairly Unsafe	Neither Unsafe nor Safe	Fairly Safe	Very Safe	Never Used
a. Immersion heater:	_____	_____	_____	_____	_____	_____
b. M-1959 range:	_____	_____	_____	_____	_____	_____
c. M-1937 range:	_____	_____	_____	_____	_____	_____
d. M-1937 burner:	_____	_____	_____	_____	_____	_____
e. M-2 burner:	_____	_____	_____	_____	_____	_____
f. Cooking on move:	_____	_____	_____	_____	_____	_____

APPENDIX A6 (cont.)

11. Please rate the school training you have received from the military in the following areas. If you were not trained in a particular area by the military, please check the column headed *No Training* next to that area.

Area	Very Bad	Fairly Bad	Neither Bad Nor Good	Fairly Good	Very Good	No Training
a. Set-up of field kitchen:	_____	_____	_____	_____	_____	_____
b. Field sanitation:	_____	_____	_____	_____	_____	_____
c. Field feeding menus:	_____	_____	_____	_____	_____	_____
d. Field food preparation:	_____	_____	_____	_____	_____	_____
e. Field food equipment:	_____	_____	_____	_____	_____	_____

APPENDIX A6 (cont.)

12. What pieces of equipment would you ADD to field kitchens?
13. What current pieces of field food service equipment would you like to see replaced?
14. What specific things do you LIKE about your food service job in the field?
15. What specific things do you DISLIKE about your food service job in the field?

APPENDIX A6 (cont.)

Description of the Work and Supervision on Your Present Job

One group of items below represents the actual work you are doing in the field and the other, your supervision in the field. We'd like you to indicate your feelings about each one of these aspects by circling "Y" (yes) if the item describes your present job, "N" (no) if it doesn't describe your job, and "?" if you cannot decide. Please circle a "Y", "N", or "?" for EACH item.

WORK

Fascinating	Y	N	?
Routine	Y	N	?
Satisfying	Y	N	?
Boring	Y	N	?
Good	Y	N	?
Creative	Y	N	?
Respected	Y	N	?
Hot	Y	N	?
Pleasant	Y	N	?
Useful	Y	N	?
Tiresome	Y	N	?
Healthful	Y	N	?
Challenging	Y	N	?
On Your Feet	Y	N	?
Frustrating	Y	N	?
Simple	Y	N	?
Endless	Y	N	?
Gives Sense of Accomplishment	Y	N	?

SUPERVISION

Asks my Advice	Y	N	?
Hard to Please	Y	N	?
Impolite	Y	N	?
Praises Good Work	Y	N	?
Tactful	Y	N	?
Influential	Y	N	?

APPENDIX A6 (cont.)

SUPERVISION (cont'd)

Up-to-Date	Y	N	?
Doesn't Supervise Enough	Y	N	?
Quick-Tempered	Y	N	?
Tells me Where I Stand	Y	N	?
Annoying	Y	N	?
Stubborn	Y	N	?
Knows Job Well	Y	N	?
Bad	Y	N	?
Intelligent	Y	N	?
Leaves me on my Own	Y	N	?
Around When Needed	Y	N	?
Lazy	Y	N	?

APPENDIX A7

NATICK LABORATORIES 1974

Mess Kit Survey — Food Service Workers

1. If the Army and the Marines were to substitute paper or plastic disposable plates for the standard metal mess kit, how would it affect the following areas in your opinion? (please check one answer for each area).

	Much worse	Little worse	no effect	Little better	Much better
a. Sanitation	—	—	—	—	—
b. Storage	—	—	—	—	—
c. Rubbish disposal	—	—	—	—	—
d. Number of KP's	—	—	—	—	—
e. Mess kit laundry line	—	—	—	—	—
f. How easy for you to serve the meal	—	—	—	—	—

2. If disposables were used, how would you dispose of them after use? (Please check one.)

— Burn

— Bury

— Other (please specify) _____

3. If the Army and the Marines were to substitute compartmented trays to be cleaned by the customer and stored by the field kitchen for the standard metal mess kit, how would it affect the following areas in your opinion? (Please check one answer for each area.)

APPENDIX A7 (cont.)

	Much worse	Little worse	No effect	Little better	Much better
a. Sanitation	—	—	—	—	—
b. Storage	—	—	—	—	—
c. Rubbish disposal	—	—	—	—	—
d. Number of KP's	—	—	—	—	—
e. Mess kit laundry line	—	—	—	—	—
f. How easy for you to serve the meal	—	—	—	—	—

APPENDIX A8

NATICK LABORATORIES 1974

Mess Kit Survey

There are at least five possible methods of serving food in the field:

1. The standard metal mess kit.
2. A compartmented tray which would be cleaned by the customer and stored by the field kitchen.
3. A plastic, disposable, compartmented tray.
4. Disposable paper plates.
5. Disposable plastic plates.

For each of the areas listed below, please give use your opinion for *each* of the five possible systems (use + if the system would be acceptable in that area, - if it would not be acceptable, or ? if you are not certain). For example, if in your opinion, the standard metal mess kit is acceptable in the sanitation area, you would write in a + under mess kit and next to sanitation; if you were not certain about sanitation for the non-disposable tray, you would write in a ? under tray and next to sanitation, etc. Be sure to place +, -, or ? in each space.

	Standard mess kit	Non- disposable tray	Disposable tray	Plastic plates	Paper plates
1.					
a. Sanitation	_____	_____	_____	_____	_____
b. Ease of cleaning	_____	_____	_____	_____	_____
c. Amount of space for food	_____	_____	_____	_____	_____
d. Ease of carrying when filled with food	_____	_____	_____	_____	_____
e. Ease of eating something which has to be cut (e.g., steak)	_____	_____	_____	_____	_____

2.					
a. Please check the ONE method you feel is BEST. Check only one	_____	_____	_____	_____	_____
b. Please check the ONE method you feel is WORST. Check only one.	_____	_____	_____	_____	_____

APPENDIX AB (cont.)

3. There are at least three possible types of utensils (knives, forks, and spoons) which might be used in the field:
 - a. The standard metal mess kit utensils.
 - b. Plastic disposable utensils.
 - c. Regular dining facility utensils.

For each of the areas listed below please give us your opinion for *each* of the three possible types (use a + if the type would be acceptable in that area, - if it would not be acceptable, or a ? if you are not certain). For example, if in your opinion the standard mess kit utensils are not acceptable in the sanitation area, you would write in a - under mess kit utensils and next to sanitation; if you were not certain about sanitation with the dining facility utensils, you would write in a ? under dining facility utensils and next to sanitation, etc. Be sure to place a +, -, or ? in each space.

	Mess kit utensils	Dining facility utensils	Plastic utensils
a. Sanitation	_____	_____	_____
b. Ease of cleaning	_____	_____	_____
c. Size of utensils	_____	_____	_____
d. Ease of cutting with the knife	_____	_____	_____
e. Overall acceptance	_____	_____	_____

APPENDIX A9

FIELD FOOD EQUIPMENT SURVEY

US ARMY NATICK LABS

1974

The purpose of this questionnaire is to find out how you feel about some of the items of food service equipment you have used in the field. Please answer each question carefully and honestly, because you have the knowledge we need to improve your equipment.

What is your rank? _____

What is your primary M.O.S.? _____

What is your branch? _____

What is your age? _____

How long have you been on active duty? _____

How much of this time have you been in food service? _____

How many years and months have you spent in the field under the following conditions?

Combat	_____	years	_____	month
Field exercises	_____	years	_____	month
Training	_____	years	_____	month

Questions 1 through 10 are about different items of field equipment that you have probably used. Under each item are several points that may have given you problems. If a point is one which has *generally* given you or your men a problem, please place a check in the "PROBLEM" column. If the point is one which has seldom or never given you or your men a problem, place a check in the "NO PROBLEM" column.

If you have had no experience with an item, please place a check in the box provided.

APPENDIX A9 (cont.)

1. In using the 5 or 10 gallon beverage dispenser, have any of the following points given you problems?

☐

I have never used the beverage dispenser.

A PROBLEM	NOT A PROBLEM
--------------	---------------------

- | | | |
|-------|-------|--|
| _____ | _____ | a. Operation of the tap valve by troops in the serving line. |
| _____ | _____ | b. Keeping the beverage at the right serving temperature. |
| _____ | _____ | c. Having enough beverage for the meal. |
| _____ | _____ | d. Cleaning of the dispenser can. |
| _____ | _____ | e. Maintaining the dispenser |
| _____ | _____ | f. Add any other problem points you have noticed.
Be as specific as possible. |

APPENDIX A9 (cont.)

2. In using the M-149 water trailer, have any of the following points given you problems?

☐

I have never used the M-149 water trailer.

A PROBLEM	NOT A PROBLEM	
_____	_____	a. Having enough water on hand.
_____	_____	b. Drawing water conveniently.
_____	_____	c. Transporting water in 5 gallon cans to point of use.
_____	_____	d. Cleaning the water tank.
_____	_____	e. Freezing of water pipes.
_____	_____	f. Add any other problem points you have noticed. Be as specific as possible.

APPENDIX A9 (cont.)

3. In using the 32 gallon can for washing mess kits and kitchen equipment, have any of the following points given you problems?

☐

I have never used the 32 gallon can.

A PROBLEM	NOT A PROBLEM	
_____	_____	a. Washing mess kits.
_____	_____	b. Washing pots and pans.
_____	_____	c. Transporting and setting up.
_____	_____	d. Filling with water.
_____	_____	e. Add any other problem points you have noticed. Be as specific as possible.

APPENDIX A9 (cont.)

4. In using the M-1967 immersion, have any of the following given you problems?

☐

I have never used the M-1967 immersion heater.

A PROBLEM	NOT A PROBLEM	
_____	_____	a. Ease of lighting the immersion heater.
_____	_____	b. Safety of lighting the immersion heater.
_____	_____	c. Heating capability of the immersion heater.
_____	_____	d. Cleaning the immersion heater.
_____	_____	e. Transporting the immersion heater.
_____	_____	f. Fuel capacity of the unit.
_____	_____	g. Relighting the hot immersion heater.
_____	_____	h. Adjusting the fuel drip.
_____	_____	i. Add any other problem points you have noticed. Be as specific as possible.

APPENDIX A9 (cont.)

5. In using the M-59 range cabinet, have any of the following points given you problems?

☐

I have never used the M-59 range.

A PROBLEM	NOT A PROBLEM	
_____	_____	a. Cleaning the range.
_____	_____	b. Heating up of the outside of the cabinet.
_____	_____	c. Grilling foods.
_____	_____	d. Cooking on two levels at once.
_____	_____	e. Loading the range on a truck.
_____	_____	f. Transporting the range.
_____	_____	g. Baking foods.
_____	_____	h. Add any other problem points you have noticed. Be as specific as possible.

APPENDIX A9 (cont.)

6. In using the accessory equipment (pots and kitchen utensils) furnished with the M-59 range, have any of the following points given you problems?

☐

I have never used this equipment.

A PROBLEM	NOT A PROBLEM	
_____	_____	a. Having enough equipment.
_____	_____	b. Having a good selection of equipment.
_____	_____	c. Cleaning of equipment.
_____	_____	d. Storing the equipment.
_____	_____	e. Packing and transporting the equipment.
_____	_____	f. Add any other problem points you have noticed. Be as specific as possible.

APPENDIX A9 (cont.)

7. In using the M-2 burner unit, have any of the following points given you problems?

☐

I have never used the M-2 burner.

A PROBLEM	NOT A PROBLEM	
_____	_____	a. Viewing the pressure gauge when pressurizing the unit.
_____	_____	b. Viewing the pressure gauge while operating the unit.
_____	_____	c. Filling the fuel tank easily.
_____	_____	d. Filling the fuel tank safely.
_____	_____	e. Pressurizing the unit.
_____	_____	f. Preheating the unit.
_____	_____	g. Lighting the unit.
_____	_____	h. Size of the fuel tank.
_____	_____	i. Getting enough heat to cook properly.
_____	_____	j. Setting the flame properly.
_____	_____	k. Moving the lighted burner to the kitchen.
_____	_____	l. Sliding the lighted burner into the range cabinet.
_____	_____	m. Getting spare parts.
_____	_____	n. Maintaining the burner.
_____	_____	o. Cleaning the burner.
_____	_____	p. Using the burner without the range cabinet.
_____	_____	q. Add any other problem points you have noticed. Be as specific as possible.

APPENDIX A9 (cont.)

8. In using the M-1948 kitchen tent, have any of the following given you problems?

☐

I have never used the M-1948 kitchen tent.

A PROBLEM	NOT A PROBLEM	
_____	_____	a. Ease of erecting the M-1948 Kitchen Tent.
_____	_____	b. Ease of striking the M-1948 Kitchen Tent.
_____	_____	c. High temperatures inside the kitchen tent.
_____	_____	d. Low temperatures inside the kitchen tent.
_____	_____	e. Transporting the kitchen tent.
_____	_____	f. Not enough space inside the tent.
_____	_____	g. Lack of protection from insects.
_____	_____	h. Shrinkage of the canvas portion of the tent.
_____	_____	i. Add any other problem points you have noticed. Be as specific as possible.

APPENDIX A9 (cont.)

9. In using the mermite can, have any of the following given you problems?

☐

I have never used the mermite can.

A PROBLEM	NOT A PROBLEM	
_____	_____	a. Keeping food hot when the can is preheated.
_____	_____	b. Keeping food hot when the can is not preheated.
_____	_____	c. Serving food from the can in the field.
_____	_____	d. Opening and closing the can.
_____	_____	e. Waterlogging of the can.
_____	_____	f. Add any other problem points you have noticed. Be as specific as possible.

APPENDIX A9 (cont.)

10. In using disposable serving gear, have any of the following given you problems?

☐

I have never used disposable serving gear.

A PROBLEM	NOT A PROBLEM	
_____	_____	a. Adequate supply of disposables.
_____	_____	b. Convenience of disposal of used items.
_____	_____	c. Paper plates are too small to hold an average meal.
_____	_____	d. Add any other problem points you have noticed. Be as specific as possible.

APPENDIX A9 (cont.)

11. This question contains several items of equipment which you might like to see included in the TO&E issued to field food service units. Please place a check in the space provided for each item you think would be a good addition to your field kitchen.

- ☐ a. Folding work tahles.
- ☐ b. Duck boards.
- ☐ c. Folding serving tables.
- ☐ d. Larger grill.
- ☐ e. Cutting board.
- ☐ f. Serving line warming equipment.
- ☐ g. Larger washing containers for pots and pans.
- ☐ h. Portable refrigeration equipment.
- ☐ i. Baking equipment.
- ☐ j. Add any other items you would like to see added to your field equipment.

APPENDIX A10

NATICK LABORATORIES 1974

Please describe the GARRISON (MAINSIDE) FEEDING SITUATION by telling us how much you agree or disagree with each of the following statements. Please use the scale at the left.

- | | | |
|--------------------------------|-------|--|
| 0 = Disagree extremely | _____ | The food is excellent in quality |
| 1 = Disagree very much | _____ | There is good food variety |
| 2 = Disagree moderately | _____ | The speed of service is fast |
| 3 = Disagree slightly | _____ | I get enough food to eat |
| 4 = Neither agree nor disagree | _____ | I can choose who I eat with any time |
| 5 = Agree slightly | _____ | The food is seasoned very well |
| 6 = Agree moderately | _____ | I like the table/chair or other feeding arrangements |
| 7 = Agree very much | _____ | The eating/serving area is usually kept neat, clean and sanitary |
| 8 = Agree extremely | _____ | |

You have just described the GARRISON (MAINSIDE) situation as it is. Now, please tell us how important each aspect is to you. Please use the IMPORTANCE SCALE below.

- | | | |
|--------------------------------|-------|---|
| 0 = Unimportant to me | _____ | Good quality food to eat |
| 1 = Slightly important to me | _____ | A large variety of items to eat |
| 2 = Moderately important to me | _____ | Getting served quickly |
| 3 = Fairly important to me | _____ | Getting enough food to feel full |
| 4 = Very important to me | _____ | Getting to sit with my friends |
| 5 = Extremely important to me | _____ | Getting food that has enough seasoning so it doesn't taste bland and flat |
| | _____ | Sitting in a comfortable area, with nice table/chair or area site to eat |
| | _____ | Eating in an area that is neat, clean and sanitary |

APPENDIX A10 (cont.)

Please describe the FIELD FEEDING SITUATION by telling us how much you agree or disagree with each of the following statements. Please use the scale at the left.

- | | | |
|--------------------------------|-------|--|
| 0 = Disagree extremely | _____ | The food is excellent in quality |
| 1 = Disagree very much | _____ | There is good food variety |
| 2 = Disagree moderately | _____ | The speed of service is fast |
| 3 = Disagree slightly | _____ | I get enough food to eat |
| 4 = Neither agree nor disagree | _____ | I can choose who I eat with any time |
| 5 = Agree slightly | _____ | The food is seasoned very well |
| 6 = Agree moderately | _____ | I like the table/chair or other feeding arrangements |
| 7 = Agree very much | _____ | The eating/serving area is usually kept neat, clean and sanitary |
| 8 = Agree extremely | _____ | |

You have just described the FIELD situation as it is. Now, please tell us how important each aspect is to you. Please use the IMPORTANCE SCALE below.

- | | | |
|--------------------------------|-------|---|
| 0 = Unimportant to me | _____ | Good quality food to eat |
| 1 = Slightly important to me | _____ | A large variety of items to eat |
| 2 = Moderately important to me | _____ | Getting served quickly |
| 3 = Fairly important to me | _____ | Getting enough food to feel full |
| 4 = Very important to me | _____ | Getting to sit with my friends |
| 5 = Extremely important to me | _____ | Getting food that has enough seasoning so it doesn't taste bland and flat |
| | _____ | Sitting in a comfortable area, with nice table/chair or area site to eat |
| | _____ | Eating in an area that is neat, clean and sanitary |

APPENDIX B

TABLE B1

Number and percentage of respondents at Camp Lejeune indicating satisfaction or dissatisfaction with aspects of their dining situation.

Area or topic	Significant Problem	Minor Problem	Total of Significant and Minor Problem	Neither Problem nor Attraction	Minor Attraction	Significant Attraction	Total of Minor and Significant Attraction
A. General dining facility environment	4 10.5%	15 39.5%	19 50.0%	16 42.1%	2 5.3%	1 32.6%	3 7.9%
B. Desirable eating companions	3 7.9%	5 13.2%	8 21.1%	24 63.2%	4 10.5%	2 5.3%	6 15.8%
C. Hours of operation	7 18.4%	7 18.4%	14 36.8%	20 52.6%	4 10.5%	0 0.0%	4 10.5%
D. Monotony of same facility	6 15.8%	13 34.2%	19 50.0%	16 42.1%	3 7.9%	0 0.0%	3 7.9%
E. Quality of food	3 7.9%	18 47.4%	21 55.3%	14 36.8%	2 5.3%	1 2.6%	3 7.9%
F. Quantity of food	9 23.7%	12 31.6%	21 55.3%	15 39.5%	1 2.6%	1 2.6%	2 5.2%
G. Service by dining facility personnel	5 13.5%	12 32.4%	17 45.9%	17 45.9%	2 5.4%	1 2.7%	3 8.1%
H. Variety of the regular meal food	10 27.0%	8 21.6%	18 48.6%	16 43.2%	1 2.7%	2 5.4%	3 8.1%

APPENDIX 8 (cont.)

TABLE B2

Number and percentage of respondents at Camp Wilson, Twenty-nine Palms, indicating satisfaction or dissatisfaction with aspects of their dining situation

Area or Topic	Very Good	Good	Total of Good and Very Good	Neither Good nor Bad	Bad	Very Bad	Total of Bad and Very Bad
A. General eating area	0 0.0%	16 15.1%	16 15.1%	30 28.3%	31 29.2%	29 27.4%	60 56.6%
8. Meal hours	11 10.3%	48 44.9%	59 55.1%	34 31.8%	7 6.5%	7 6.5%	14 13.0%
C. Monotony of same eating area	2 2.0%	14 13.9%	16 15.9%	48 47.5%	19 18.8%	18 17.8%	37 36.6%
D. Quality of food	3 2.8%	24 22.6%	27 25.4%	28 26.4%	25 23.5%	26 24.5%	51 48.1%
E. Quantity of food	11 10.6%	35 33.6%	46 44.2%	25 24.0%	22 21.2%	11 10.6%	33 31.7%
F. Service by mess personnel	3 2.9%	24 23.3%	27 26.2%	27 26.2%	18 17.5%	30 30.1%	48 47.6%
G. Variety of the food	5 4.7%	28 26.4%	33 31.1%	27 34.9%	15 14.2%	21 19.8%	36 34.0%

APPENDIX B (cont.)

TABLE B3

Number and percentage of respondents on the front line, Twenty-nine Palms, indicating satisfaction or dissatisfaction with aspects of their dining situation

Area or Topic	Very Good	Good	Total of Good and Very Good	Neither Good nor Bad	Bad	Very Bad	Total of Bad and Very Bad
A. General eating area	1 2.4%	2 4.9%	3 7.3%	15 36.8%	14 34.2%	9 22.0%	23 56.2%
B. Meal hours	0 0.0%	18 45.0%	18 45.0%	13 32.5%	7 17.5%	2 5.0%	9 22.5%
C. Monotony of same eating area	1 2.6%	4 10.3%	5 12.9%	22 56.4%	9 23.1%	3 7.7%	12 30.8%
D. Quality of food	0 0.0%	7 16.7%	7 16.7%	15 35.7%	15 35.7%	5 11.9%	20 47.6%
E. Quantity of food	1 2.6%	15 38.5%	16 41.1%	12 30.8%	9 23.1%	2 5.1%	11 28.2%
F. Service by mess personnel	4 9.3%	9 20.9%	13 30.2%	13 30.2%	6 14.0%	11 25.5%	17 39.5%
G. Variety of the food	0 0.0%	11 27.5%	11 27.5%	14 35.0%	8 20.0%	7 17.5%	15 37.5%

APPENDIX 8 (cont.)

TABLE B4

Number and percentage of respondents in Germany indicating satisfaction or dissatisfaction with aspects of their dining situation

Area or Topic	Very Good	Good	Total of Good and Very Good	Neither Good nor Bad	Bad	Very Bad	Total of Bad and Very Bad
A. General eating area	7 9.5%	21 28.4%	28 37.9%	30 40.5%	12 16.2%	4 5.4%	16 21.6%
B. Meal hours	9 12.2%	41 55.4%	50 67.6%	8 10.8%	9 12.2%	7 9.5%	16 21.7%
C. Monotony of same eating area	6 8.1%	19 25.7%	25 33.8%	44 59.5%	4 5.4%	1 1.4%	5 6.8%
D. Quality of food	5 6.8%	28 37.8%	33 44.6%	22 29.7%	15 20.3%	4 5.4%	19 25.7%
E. Quantity of food	5 6.8%	26 35.1%	31 41.9%	18 24.3%	20 27.0%	5 6.8%	25 33.8%
F. Service by mess personnel	10 13.5%	29 39.2%	39 52.7%	19 25.7%	11 14.9%	5 6.8%	16 21.7%
G. Variety of the food	6 8.1%	25 33.8%	31 41.9%	27 36.5%	9 12.2%	7 9.5%	16 21.7%

APPENDIX C

TABLE C1

Number and percentage of respondents at Camp Lejeune indicating their opinion
about the quantity of food wanted in a meal

Food Class	Much More	More	Total of Much More and More	Amount Now Enough	Less	Much Less	Total of Much Less and Less
Meats	11 30.6%	16 44.4%	27 75.0%	8 22.2%	0 0.0%	1 2.8%	1 2.8%
Casseroles	2 5.9%	18 52.9%	20 58.8%	9 26.5%	4 11.8%	1 2.9%	5 14.7%
Starches	1 2.7%	8 21.6%	9 24.3%	15 40.5%	11 29.7%	2 5.4%	13 35.1%
Vegetables	4 10.8%	17 45.9%	21 56.7%	12 32.4%	4 10.8%	0 0.0%	4 10.8%
Salads	5 15.2%	14 42.4%	19 57.6%	14 42.4%	0 0.0%	0 0.0%	0 0.0%
Beverages	15 42.9%	16 45.7%	31 88.6%	4 11.4%	0 0.0%	0 0.0%	0 0.0%
Desserts	6 17.1%	16 45.7%	22 62.8%	13 37.1%	0 0.0%	0 0.0%	0 0.0%
Breads	5 15.2%	11 33.3%	16 48.5%	15 45.5%	2 6.1%	0 0.0%	2 6.1%
Fruits	10 28.6%	18 51.4%	28 80.0%	6 17.1%	1 2.9%	0 0.0%	1 2.9%
Soups	9 26.5%	14 41.2%	23 67.7%	11 32.4%	0 0.0%	0 0.0%	0 0.0%

APPENDIX C (cont.)

TABLE C2

Number and percentage of respondents at Camp Wilson, Twenty-nine Palms, indicating their opinion about the quantity of food wanted in a meal

Food Class	Much More	More	Total of Much More and More	Amount Now Enough	Less	Much Less	Total of Much Less and Less
Meats	22 21.0%	30 28.6%	52 49.6%	49 46.1%	3 3.8%	0 0.0%	3 3.8%
Casseroles	22 22.4%	16 16.3%	38 38.7%	51 52.0%	6 6.1%	3 3.1%	9 9.2%
Starches	7 6.8%	9 8.7%	16 15.5%	57 55.3%	22 21.4%	8 7.8%	30 29.2%
Vegetables	13 12.5%	25 24.0%	38 35.5%	64 61.5%	1 1.0%	1 1.0%	2 2.0%
Salads	14 13.3%	18 17.1%	32 30.4%	67 63.8%	4 3.8%	2 1.9%	6 5.7%
Beverages	39 37.1%	26 24.8%	65 61.9%	34 32.4%	4 3.8%	2 1.9%	6 5.7%
Desserts	27 26.5%	33 31.1%	60 57.6%	35 33.0%	6 5.7%	5 4.7%	11 10.4%
Breads	10 9.8%	15 14.7%	25 24.5%	69 67.6%	6 5.9%	2 1.9%	8 7.8%
Fruits	32 29.9%	38 35.5%	70 65.4%	31 29.0%	2 1.9%	4 3.7%	6 5.6%
Soups	10 9.5%	15 14.3%	25 23.8%	64 61.0%	5 4.8%	11 10.4%	16 15.2%

APPENDIX C (cont.)

TABLE C3

Number and percentage of respondents on the front line, Twenty-nine Palms, indicating their opinion about the quantity of food wanted in a meal

Food Class	Much More	More	Total of Much More and More	Amount Now Enough	Less	Much Less	Total of Much Less and Less
Meats	5 12.2%	21 51.2%	26 63.4%	14 34.2%	1 2.4%	0 0.0%	1 2.4%
Casseroles	4 10.3%	8 20.5%	12 30.8%	23 59.0%	4 10.3%	0 0.0%	4 10.3%
Starches	1 2.4%	5 12.2%	6 14.6%	24 58.5%	8 19.5%	3 7.3%	11 26.8%
Vegetables	6 15.0%	15 37.5%	21 52.5%	18 45.0%	1 2.5%	0 0.0%	1 2.5%
Salads	11 28.2%	13 33.3%	24 61.5%	15 38.5%	0 0.0%	0 0.0%	0 0.0%
Beverages	21 51.2%	14 34.2%	35 85.4%	6 14.6%	0 0.0%	0 0.0%	0 0.0%
Desserts	12 29.3%	9 21.9%	21 51.2%	19 46.3%	1 2.4%	0 0.0%	1 2.4%
Breads	4 10.0%	5 12.5%	9 22.5%	28 70.0%	3 7.5%	0 0.0%	3 7.5%
Fruits	18 43.9%	13 31.7%	31 75.6%	9 22.0%	0 0.0%	1 2.4%	1 2.4%
Soups	2 5.1%	9 23.1%	11 28.2%	24 61.5%	3 7.7%	1 2.6%	4 10.3%

APPENDIX C (cont.)

TABLE C4

Number and percentage of respondents in Germany indicating their opinion
about the quantity of food wanted in a meal

Food Class	Much More	More	Total of Much More and More	Amount Now Enough	Less	Much Less	Total of Much Less and Less
Meats	26 37.1%	32 45.7%	58 80.8%	12 17.1%	0 0.0%	0 0.0%	0 0.0%
Casseroles	10 14.5%	25 36.2%	35 50.7%	28 40.6%	5 7.2%	1 1.4%	6 8.6%
Starches	5 7.2%	9 13.0%	14 20.2%	40 58.0%	13 18.8%	2 2.9%	15 21.7%
Vegetables	9 13.0%	19 27.5%	28 40.5%	39 56.5%	2 2.9%	0 0.0%	2 2.9%
Salads	5 7.2%	16 23.2%	21 30.4%	47 68.1%	1 1.4%	0 0.0%	1 1.4%
Beverages	21 30.4%	25 36.2%	46 66.6%	22 31.9%	1 1.4%	0 0.0%	1 1.4%
Desserts	28 40.0%	23 32.9%	51 72.9%	17 24.3%	2 2.9%	0 0.0%	2 2.9%
Breads	9 13.0%	11 15.9%	20 28.9%	46 66.7%	2 2.9%	1 1.4%	3 4.3%
Fruits	27 39.1%	16 23.2%	43 62.3%	25 36.2%	1 1.4%	0 0.0%	1 1.4%
Soups	9 13.0%	15 21.7%	24 34.7%	43 62.3%	1 1.4%	1 1.4%	2 2.8%

APPENDIX D

TABLE D1

Number and percentage of respondents at Camp Lejeune indicating their opinions about the quantity of food wanted in a meal in the field compared to the amount wanted when in the garrison

Food Class	Much More in Field	More in Field	Total of Much More and More	Same	Less in Field	Much Less in Field	Total of Much Less and Less
Meats	13 33.3%	16 41.0%	29 74.3%	6 15.4%	2 5.1%	2 5.1%	4 10.2%
Casseroles	4 10.8%	14 37.8%	18 48.6%	9 24.3%	7 18.9%	3 8.1%	10 27.0%
Starches	4 10.3%	7 17.9%	11 28.2%	16 41.0%	7 17.9%	5 12.8%	12 30.7%
Vegetables	6 15.4%	13 48.7%	25 64.1%	11 28.2%	0 0.0%	3 7.7%	3 7.7%
Salads	6 16.2%	16 43.2%	22 59.4%	7 18.9%	7 18.9%	1 2.7%	8 21.6%
Beverages	16 43.2%	17 45.9%	33 89.1%	1 2.7%	1 2.7%	2 5.4%	3 8.1%
Desserts	7 18.4%	14 36.8%	21 55.2%	8 21.1%	6 15.8%	3 7.9%	9 23.7%
Breads	4 11.4%	13 37.1%	17 48.5%	11 31.4%	4 11.4%	3 8.6%	7 20.0%
Fruits	13 33.3%	17 43.6%	30 76.9%	7 17.9%	1 2.6%	1 2.6%	2 5.2%
Soups	9 23.7%	12 31.6%	21 55.3%	12 31.6%	4 10.5%	1 2.6%	5 13.1%

APPENDIX D (cont.)

TABLE D2

Number and percentage of respondents at Camp Wilson, Twenty-nine Palms, indicating their opinion about the quantity of food wanted in a meal in the field compared to the amount wanted in garrison

Food Class	Much More in Field	More in Field	Total of Much More and More	Same	Less in Field	Much Less in Field	Total of Much Less and Less
Meats	29 29.9%	26 26.8%	55 56.7%	29 29.9%	11 11.3%	2 2.1%	13 13.4%
Casseroles	10 10.4%	22 22.9%	32 33.3%	45 46.9%	15 15.6%	4 4.2%	19 19.8%
Starches	8 8.5%	20 21.3%	28 29.8%	40 42.6%	26 27.7%	0 0.0%	26 27.7%
Vegetables	14 14.4%	30 30.9%	44 45.4%	43 44.3%	8 8.2%	2 2.1%	10 10.3%
Salads	16 16.7%	28 29.2%	44 45.8%	35 36.5%	14 14.6%	3 3.1%	17 17.7%
Beverages	45 45.5%	30 30.3%	75 75.8%	14 14.1%	6 6.1%	4 4.0%	10 10.1%
Desserts	23 23.7%	28 28.9%	51 52.6%	29 29.9%	13 13.4%	4 4.1%	17 17.5%
Breads	13 13.7%	16 16.8%	29 30.5%	50 52.6%	15 15.8%	1 1.0%	16 16.8%
Fruits	35 36.1%	29 29.9%	64 66.0%	22 22.7%	7 7.2%	4 4.1%	11 11.3%
Soups	9 9.7%	15 16.3%	24 25.8%	47 50.5%	16 17.2%	6 6.4%	22 23.6%

APPENDIX D (cont.)

TABLE D3

Number and percentage of respondents on the front line, Twenty-nine Palms, indicating their opinion about the quantity of food wanted in a meal in the field compared to the amount wanted when in garrison

Food Class	Much More in Field	More in Field	Total of Much More and More	Same	Less in Field	Much Less in Field	Total of Much Less and Less
Meats	8 19.5%	16 39.0%	24 58.5%	12 29.3%	3 7.3%	2 4.9%	5 12.2%
Casseroles	0 0.0%	9 22.0%	9 22.0%	19 46.3%	13 31.7%	0 0.0%	13 31.7%
Starches	1 2.5%	9 22.5%	10 25.0%	18 45.0%	10 25.0%	2 5.0%	12 30.0%
Vegetables	5 12.2%	15 36.6%	20 48.8%	13 31.8%	5 12.2%	3 7.3%	8 19.5%
Salads	7 18.0%	15 38.5%	22 56.4%	11 28.2%	4 10.3%	2 5.1%	6 15.4%
Beverages	26 65.0%	7 20.0%	33 85.0%	5 12.5%	1 2.5%	0 0.0%	1 2.5%
Desserts	10 25.0%	12 30.0%	22 55.0%	14 35.0%	3 7.5%	1 2.5%	4 10.0%
Breads	5 12.5%	8 20.0%	13 32.5%	21 52.5%	5 12.5%	1 2.5%	6 15.0%
Fruits	18 45.0%	14 35.0%	32 80.0%	7 17.5%	1 2.5%	0 0.0%	1 2.5%
Soups	6 15.4%	3 7.7%	9 23.1%	20 51.3%	8 20.5%	2 5.1%	10 25.6%

APPENDIX D (cont.)

TABLE D4

Number and percentage of respondents in Germany indicating their opinion about the quantity of food wanted in a meal in the field compared to the amount wanted when in garrison

Food Class	Much More in Field	More in Field	Total of Much More and More	Same	Less in Field	Much Less in Field	Total of Much Less and Less
Meats	18 27.7%	30 46.2%	48 73.9%	13 20.0%	2 3.1%	2 3.1%	4 6.2%
Casseroles	13 20.0%	15 23.1%	28 43.1%	23 35.4%	11 16.9%	3 4.6%	14 21.5%
Starches	8 12.3%	10 15.4%	18 27.7%	36 55.4%	10 15.4%	1 1.5%	11 16.9%
Vegetables	13 20.0%	18 27.7%	31 47.7%	33 50.8%	1 1.5%	0 0.0%	1 1.5%
Salads	11 16.9%	16 24.6%	27 41.5%	37 56.9%	1 1.5%	0 0.0%	1 1.5%
Beverages	21 32.3%	21 32.3%	41 64.6%	18 27.7%	3 4.6%	2 3.1%	5 7.7%
Desserts	19 29.2%	19 29.2%	38 58.4%	22 33.8%	1 1.5%	4 6.2%	5 7.7%
Breads	9 13.8%	12 18.5%	21 32.3%	41 63.1%	2 3.1%	1 1.5%	3 4.6%
Fruits	23 35.4%	22 33.8%	45 69.2%	16 24.6%	2 3.1%	2 3.1%	4 6.2%
Soups	15 23.1%	22 33.8%	37 56.9%	27 41.5%	1 1.5%	0 0.0%	1 1.5%

APPENDIX E

TABLE E1

Number of respondents at Camp Lejeune indicating the
amount of increase wanted in the serving size of
various foods

Food Class	Two Times	Three Times	Four Times	Five Times or More
Meat	5	1	1	
Bacon		1		
Hamburgers	1			
Hot Dogs	1			
Meatballs	1			
Casseroles	1			
Starch	1			
Spaghetti		1		
Salads			1	
Beverages		1	1	
Milk	2			
Tea	2			
Desserts	3			1
Pudding	1			
Bread		1		
Soup	2			
Eggs	1			
Grinders	1			
C-rations	1			
Spices			1	

Number of respondents at Camp Wilson, Twenty-nine Palms,
indicating the amount of increase wanted in the
serving size of various foods

Food Class	Two Times	Three Times	Four Times	Five Times or More
Meat	19	2	3	1
Bacon	1			
Meat loaf	1			
Pot Roast	1			
Poultry	1			
Sausage		1		
Steak	1			
Fish	2			
Casseroles	1	1		
Potatoes		1	1	
Vegetables	6	1		1
Salads	4	1		1
Beverages	4	5	2	1
Cofee				1
Juice			2	
Milk	5	3	4	2
Water				1
Desserts	6	3		
Candy		1		
Ice Cream		1		
Bread	3		1	1
Fruit	9	4	4	1
Oranges		1		
Soup		2		
Eggs	1	1		
Butter	1	1		
Salt	1			2

APPENDIX E (cont.)

TABLE E3

Number of respondents on the front line, Twenty-nine Palms,
indicating the amount of increase wanted in the serving
size of various foods

Food Class	Two Times	Three Times	Four Times	Five Times or More
Meat	7	2		
Bacon	1			
Beef	1			
Breakfast Meats		1		
Roast Beef			1	
Steak	1	1		
Casseroles	1	1		1
Potatoes	1			
Vegetables	2	1		
Salads	4	2		
Reverages	2	1	2	3
Soda			1	
Desserts	3	3	1	
Bread	2	2		
Fruit	7	5	1	3
Soup	1			
Eggs	1			
Ice			1	

APPENDIX E (cont.)

TABLE E4

Number of respondents in Germany indicating the amount of
increase wanted in the serving size of various foods

Food Class	Two Times	Three Times	Four or More	Five Times or More
Meat	20	3	1	
Bacon	1			
Beef		1		
Chicken	1			
Pork Chops	1			
Ribs	1			
Steak		2		
Turkey	1			
Seafood	1	1	1	
Casseroles	2	2		
Starch		1		1
Potatoes	1			
Rice	1		1	
Spaghetti	2	1		
Vegetables	4	2	1	
Corn			1	
Greens	2			1
Salads	1	1		1
Beverages	4	3		
Juice				1
Desserts	8	4	1	1
Strawberry Shortcake	1			
Bread	1	1		
Fruit	9	2	2	
Apples				1
Oranges				1
Peaches		1		
Pears		1		
Soup	2	1		1
Eggs	1			

APPENDIX F

TABLE F1

Camp Lejeune. Means and standard deviations of: 1) number of servings of a food respondents indicated they currently receive per week, and 2) number of servings of a food respondents indicated they want per week.

Foods	Mean of # servings currently received	Standard deviation	Mean of # servings wanted	Standard deviation	Number of respondents	Difference between means
Meat	6.0		20.0		1.0	14.0
Spareribs	0.0		1.0		1.0	1.0
Seafood	1.0		2.0		1.0	1.0
Casseroles	0.0		2.0		1.0	2.0
Starch	1.0		3.0		1.0	2.0
Vegetables	0.0		9.0		1.0	9.0
Salad	0.0	0.0	3.3	0.6	2.0	3.3
Beverages	0.0		7.0		1.0	7.0
Juice	0.0		3.0		1.0	3.0
Desserts	—					
Pie	0.0		7.0		1.0	7.0
Fruit	6.0		12.0		1.0	6.0
Soup	0.0		3.0		1.0	3.0

APPENDIX F (cont.)

TABLE F2

Front lines, Twenty-nine Palms. Means and standard deviations of 1) number of servings of a food respondents indicated they currently receive per week, and 2) number of servings of a food respondents indicated they want per week.

Foods	Mean of # servings currently received	Standard deviation	Mean of # servings wanted	Standard deviation	Number of respondents	Difference between means
Meat						
Ham	1.0		2.0		1	1.0
Meat Loaf	1.0		2.0		1	1.0
Roast Beef	1.0		2.0		1	1.0
Steak	0.8	0.5	2.8	1.0	4	2.0
Fish	0.0	0.0	1.5	0.5	2	1.5
Salads	0.0	0.0	4.8	0.4	2	4.8
Beverages	-					
Beer	0.0	0.0	10.5	4.9	2	10.5
Kool Aid	0.0		7.0		1	7.0
Soft Drinks	7.0		21.0		1	14.0
Desserts	-					
Ice Cream	0.0		2.0		1	2.0
Pie	0.0		2.0		1	2.0
Fruit	2.0	0.7	4.6	0.5	5	2.6
Melons	2.0		5.0		1	3.0
French Toast	2.0		3.0		1	1.0
Hot Cakes	3.0		5.0		1	2.0
Tacos	0.0		1.0		1	1.0

APPENDIX F (cont.)

TABLE F3

Camp Wilson, Twenty-nine Palms. Means and standard deviations of
 1) number of servings of food respondents indicated they currently
 receive per week, and 2) number of servings of food respondents
 indicated they went per week.

Foods	Mean of # servings currently received	Standard deviation	Mean of # servings wanted	Standard deviation	Number of respondents	Difference between means
Meat	5.3	2.5	7.3	2.5	3	2.0
Beef	2.0		6.0		1	4.0
Ham	1.0		2.0		1	1.0
Hamburger	0.0		2.0		1	2.0
Lamb	0.0	0.0	1.0	0.0	2	1.0
Meatloaf	0.0		2.0		1	2.0
Pork Chops	1.0		2.0		1	1.0
Roast Beef	0.0		1.0		1	1.0
Sausage	1.0		2.0		1	1.0
Steak	1.1	0.6	3.5	1.8	8	2.4
Turkey	0.0		1.0		1	1.0
Veal	0.0		2.0		1	2.0
Fish	0.0		2.0		1	2.0
Seafood	0.0		2.0		1	2.0
Casseroles	0.2	0.5	2.0	0.8	4	1.8
Potatoes	—					
(French Fries)	0.0		1.0		1	1.0
Vegetables	—					
Corn	0.0		2.0		1	2.0
Greens	3.0	0.0	15.5	7.8	2	12.5
Peas	1.0		2.0		1	1.0
Salads	—					
Cole Slaw	0.0	0.0	1.5	0.7	2	1.5
Green	3.0		4.0		1	1.0
Fruit	0.0		3.0		1	3.0
Beverages	7.0		14.0		1	7.0
Juice	1.0		4.0		1	3.0
Milk	0.5	0.7	14.0	9.9	2	13.5
Desserts	3.8	1.0	5.5	1.0	4	1.7
Ice Cream	0.5	0.7	2.5	0.7	2	2.0
Pie	0.0		2.0		1	2.0
Fruit	4.5	2.4	12.2	6.9	4	7.7
Soup	0.2	0.5	2.8	0.5	4	2.6
Eggs	0.0	0.0	6.0	1.4	2	6.0
Grits	0.0		2.0		1	2.0
Mexican Food	0.0		1.0		1	1.0
Pancakes	0.5	0.7	2.0	1.4	2	1.5

APPENDIX F (cont.)

TABLE F4

Garman. Means and standard deviations of: 1) number of servings of a food respondents indicated they currently receive per week, and 2) number of servings of a food respondents indicated they want per week.

Food	Mean of # servings currently received	Standard deviation	Mean of # servings wanted	Standard deviation	Number of respondents	Difference between means
Meat	3.0		6.0		1	3.0
Chicken	0.5	0.7	2.0	0.0	2	1.5
Ribs	0.0		1.0		1	1.0
Steak	0.0	0.0	1.5	0.5	2	1.5
Fish	0.3	0.6	3.7	1.2	3	3.4
Casseroles	0.0		3.0		1	3.0
Starch	14.0		21.0		1	7.0
Spaghetti	0.0		1.0		1	1.0
Vegetables	7.0	6.2	15.0	11.4	3	8.0
Salad	0.0		1.0		1	1.0
Beverages	5.0		15.0		1	10.0
Juice	7.0		20.0		1	13.0
Desserts	0.0	0.0	5.7	1.2	3	5.7
Pie	0.0		3.0		1	3.0
Bread	5		10.0		1	5.0
Fruit	3.0	0.0	6.0	1.4	2	3.0
Peaches	1.0		3.0		1	2.0
Pears	1.0		3.0		1	2.0

APPENDIX G

TABLE G1

FOOD SERVICE WORKERS SURVEYED/INTERVIEWED DISTRIBUTED BY RANK

BASE/EXERCISE	RANK										TOTAL
	E-1	E-2	E-3	E-4	E-5	E-6	E-7	WO	O	CIV	
TWENTY-NINE PALMS (MARINES)	6	4	5	1	0	3	1	0	0	0	20
REFORGER — GERMANY (ARMY)	0	5	7	14	6	4	4	0	0	0	40
FORT LEE (ARMY)	0	0	0	1	10	21	33	10	8	3	86

**PIECES OF EQUIPMENT TO BE REPLACED WITH OR
ADDED TO FIELD KITCHENS -- FREQUENCY OF RESPONSE**

EQUIPMENT TO BE REPLACED

	29 PALMS*	REFORGER**	TOTAL
Nothing	2	14	16
Immersion Heater	5	9	14
M-1937	11	3	14
Kitchen Tent	1	7	8
Mess Kit Laundry Line (for pots and pans)	1	4	5
Spatula	1	3	4

EQUIPMENT TO BE ADDED

	29 PALMS*	REFORGER**	TOTAL
Nothing	1	14	15
Something to help keep Food Hot on Serving Line	2	5	7
Better or more refrigeration	1	3	4
Bakery unit	2	1	3
Work tables	0	3	3
Portable grille	1	2	3
Cutting board	0	3	3

*20 Workers

**40 Workers

**PROBLEM AREAS CITED BY AT LEAST 25% OF FORT LEE
RESPONDENTS FOR TEN FOOD SERVICE EQUIPMENT ITEMS
PER CENT RATING AREA AS A PROBLEM**

a. M-1948 Kitchen Tent (Question 8, 73 respondents)		
1.	Ease of erecting tent	64%
2.	High temperature inside tent	59%
3.	Ease of striking tent	41%
4.	Transporting tent	40%
5.	Shrinking of canvas portion of tent	25%
b. M-1967 Immersion Heater (Question 4, 61 respondents)		
1.	Cleaning heater	48%
2.	Relighting hot heater	41%
3.	Safety of lighting heater	38%
4.	Transporting heater	26%
c. 32 Gallon Can (Question 3, 79 respondents)		
1.	Washing pots and pans	61%
2.	Transporting and setting up	38%
d. M-2 Burner (Question 7, 71 respondents)		
1.	Getting spare parts	55%
2.	Moving lighted burner	34%
e. Disposable Serving Gear (Question 10, 56 respondents)		
1.	Too small to hold meal	55%
2.	Adequate supply	30%
f. M-1949 Water Trailer (Question 2, 70 respondents)		
1.	Freezing of water pipes	53%
2.	Cleaning water tank	31%
g. Mermite Can (Question 9, 80 respondents)		
1.	Keeping food hot when can is not preheated	48%
2.	Waterlogging of can	26%

APPENDIX G (cont.)

TABLE G3 (cont.)

(Continued)

h. Range Accessory Equipment (Question 6, 74 respondents)

- | | |
|--------------------------------|-----|
| 1. Enough equipment | 28% |
| 2. Good selection of equipment | 25% |

i. M-1959 Range Cabinet (Question 5, 73 respondents)

- | | |
|-------------|-----|
| 1. Cleaning | 32% |
|-------------|-----|

j. Beverage Dispenser (Question 1, 64 respondents)

- | | |
|----------------|-----|
| 1. Maintenance | 30% |
|----------------|-----|

APPENDIX G (cont.)

TABLE G4

ITEMS RATED AS DESIRABLE ADDITIONS TO FIELD

KITCHENS BY FORT LEE RESPONDENTS

PER CENT RESPONSES

a.	Portable Refrigeration Equipment	87%
b.	Folding Work Tables	74%
c.	Folding Serving Tables	72%
d.	Larger Washing Container for Pots and Pans	71%
e.	Larger Grille	64%
f.	Serving Line Warming Equipment	59%
g.	Duck Boards	56%
h.	Cutting Board	52%
i.	Baking Equipment	46%

APPENDIX H

TABLE H1

Food Service Workers Surveyed/Interviewed
Distributed by Rank

Base/Exercise	E-1	E-2	E-3	E-4	E-5	E-6	E-7	TOTAL
Camp Lejeune (Marines)	5	9	9	2	0	0	1	26
29 Palms (Marines)	6	4	5	1	0	3	1	20
Reforger-Germany (Army)	0	5	7	14	6	4	4	40