

AD-A076 144

ARMED FORCES FOOD SCIENCE ESTABLISHMENT SCOTTSDALE (A--ETC F/G 6/8
FIELD EVALUATION OF AUSTRALIAN RATION PACKS, (U)

NOV 78 W E BADCOCK , D J LICHTENSTEIN

UNCLASSIFIED

AFFSE-4/78

NL

| OF |
ADA
076144



END	END
DATE	DATE
FILMED	FILMED
12-79	12-79
DDC	DDC

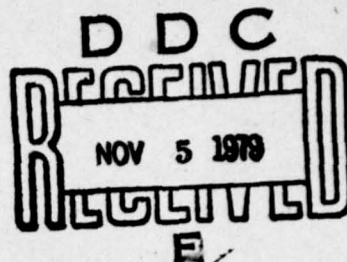
AD A076144

UNCLASSIFIED

AFFSE REPORT 4/78

LEVEL

AR No. 001562



Department of Defence
Defence Science and Technology Organisation
Armed Forces Food Science Establishment
Scottsdale, Tasmania

14 AFFSE REPORT 4/78

© COMMONWEALTH OF AUSTRALIA, 1978

DDC FILE COPY

6 Field Evaluation of Australian
Ration Packs, (U)

APPROVED
FOR PUBLIC RELEASE



11 Nov 78

10 W. E. BADCOCK
and
D. J. LICHTENSTEIN

410 231 79 11 05 097 November, 1978

50B

THE UNITED STATES NATIONAL
TECHNICAL INFORMATION SERVICE
IS AUTHORIZED TO
REPRODUCE AND SELL THIS REPORT

APPROVED
FOR PUBLIC RELEASE

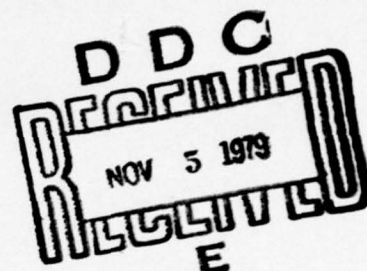
UNCLASSIFIED

DEPARTMENT OF DEFENCE
ARMED FORCES FOOD SCIENCE ESTABLISHMENT

AFFSE REPORT 4/78

FIELD EVALUATION OF AUSTRALIAN
RATION PACKS (U)

W. E. BADCOCK and D. J. LICHTENSTEIN



© COMMONWEALTH OF AUSTRALIA, 1978

SUMMARY

Troop feeding trials were conducted to determine the consumer acceptability and Service suitability of the Patrol Ration (One Man) and Combat Ration (One Man) packs on issue to Australian Servicemen.

These trials were superimposed upon field exercises which were conducted by the Services.

Results obtained indicated that, although the ration packs are generally satisfactory, implementation of the recommended changes should produce further improvements. (U)

This document has been approved
for public release and sale; its
distribution is unlimited.

POSTAL ADDRESS: The Director,
Armed Forces Food Science Establishment,
P.O. Box 147,
Scottsdale, Tasmania, 7254

DOCUMENT CONTROL DATA SHEET

UNCLAS

1. DOCUMENT NUMBERS

- a. AR Number: 001562
b. Document Series and Number:—
c. Report Number: 4/78

2. SECURITY CLASSIFICATION

- a. Complete document:
Unclas
b. Title in isolation:
Unclas
c. Summary in isolation:
Unclas

3. TITLE: Laboratory Evaluation of Australian Ration Packs

4. PERSONAL AUTHOR(S):

Badcock, W.E.
Lichtenstein, D.J.

5. DOCUMENT DATE:

Nov, 1978

6. TYPE OF REPORT AND PERIOD COVERED:

Technical Report

7. CORPORATE AUTHOR:

Armed Forces Food Science
Establishment,
Scottsdale, Tasmania, Aust.

8. REFERENCE NUMBERS:

- a. Task: FSE 76/038
b. Sponsoring Agency:
DOD (Army)

9. COST CODE: 241

10. IMPRINT:

AFFSE — Nov, 1978

11. COMPUTER PROGRAM:

—

12. RELEASE LIMITATIONS:

Approved for public release

12-0 OVERSEAS: N.O. ☐ P.R. 1 ☐ A ☐ B ☐ C ☐ D ☐ E ☐

13. ANNOUNCEMENT LIMITATIONS: —

14. DESCRIPTORS:

Military rations, field evaluations,
acceptability.

15. COSATI CODES:

0608-0204

16. SUMMARY:

Troop feeding trials were conducted to determine the consumer acceptability and Service suitability of the Patrol Ration (One Man) and Combat Ration (One Man) packs on issue to Australian Servicemen.

These trials were superimposed upon field exercises which were conducted by the Services.

Results obtained indicated that, although the ration packs are generally satisfactory, implementation of the recommended changes should produce further improvements. (U)

UNCLAS

CONTENTS

	Page No.
Abstract	
Introduction	1
The Evaluation	2
Part A — Patrol Ration (One Man)	4
Part B — Combat Ration (One Man)	13
Acknowledgements	15
Annexes: A. Combat Ration (One Man) User Questionnaire	
B. Patrol Ration (One Man) User Questionnaire	
C. Combat Ration (One Man) Contents Sheet	
D. Patrol Ration (One Man) Contents Sheet	
Distribution List	

Accession For	
NTIS GRA&I	<input checked="" type="checkbox"/>
DDC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By _____	
Distribution/	
Availability Codes	
Dist	Avail and/or special
A	

FIELD EVALUATION OF AUSTRALIAN RATION PACKS

by

W. E. Badcock and D. J. Lichtenstein

INTRODUCTION

The principal function of the Armed Forces Food Science Establishment (AFFSE) is the assessment of the nutritional requirements of servicemen under the various conditions in which they may be required to operate, and the translation of these requirements into practical ration scales and ration packs suitable for use under service conditions. The present report limits itself to 24-hour One Man ration packs.

During the translation of these requirements, other non-nutritional factors influence the selection of items for ration packs. Some of these are detailed below:

1. The ration packs should be as compact and as light as possible (consistent with other essential characteristics);
2. The ration packs should consist of the minimum number of separate items, requiring the minimum preparation so that if necessary, under emergency conditions, the food components may be consumed cold or without the addition of water. However, the attractiveness of the meals will be enhanced if more time is available for their preparation to allow for heating and reconstitution.
3. The items require adequate packaging to withstand the severe handling which may be encountered under operational conditions, and to protect them from contamination and deterioration;
4. The items should have a minimum storage life of two years under tropical conditions;
5. Above all, the rations must be acceptable to Australian Servicemen.

In addition, all components should be readily available and of Australian origin; if any items not produced locally are required, the AFFSE should co-operate with industry in developing suitable items.

The normal financial constraints apply also in the selection of ration items.

While many of the qualities required of ration components may be assessed in the laboratory (or market place), the acceptability to the ultimate consumer, and the suitability in the field, can only be evaluated under field conditions which simulate as closely as practicable what might be expected during military operations.

In the recent past, because of a very limited number of field evaluations, changes to ration pack components have sometimes been made more on the basis of the former considerations rather than on the basis of field testing. At the same time it is likely that there have been changes in the operating conditions for which the packs were envisaged as well as changes in the tastes and expectations of young Australian men.

Accordingly, the Nutrition/Physiology Section AFFSE was tasked to undertake these field evaluations to obtain a better balance of the requirements than hitherto. However, it must be appreciated that the survey is a continuous one, because changes in any of these requirements may dictate changes in the ration packs. This report refers mainly to ration packs used on selected exercises held all over Australia during the last few years and involving as many of the major users as possible.

THE EVALUATION

The majority of the exercises listed in this report (see Table 1) were attended by one of the authors (DJL). All exercises were planned and conducted by the units concerned (or their higher formations) with very little technical control being exercised by the AFFSE personnel. This working arrangement was due mainly to the lack of previous field experience on the part of the AFFSE officers concerned and accordingly the trials were considered to be of a preliminary nature only. It was considered that the need for familiarisation with field conditions coupled with the direct contact with service personnel, at all levels, would be necessary to ensure the technical success of more extensive trials in the future.

Information about the acceptability and service suitability of ration packs was obtained through the analysis of questionnaires completed by servicemen at exercises, supplemented by direct observation and interviews with users. The data collected using the questionnaires were subsequently analysed using a Hewlett-Packard 9825A programmable calculator.

The questionnaires have undergone considerable modification since their introduction at exercises "Latin Forum" and "Round Apple One" in 1974 and 1975 respectively. Questionnaires were progressively modified as their shortcomings were realised; the objective being to obtain as much useful information as possible on the acceptability and service suitability of these ration packs. The current format is set out at Annexes A and B.

Acceptability is based on a 5 point hedonic rating scale with the range extending from -2 to +2. The ends of the scale correspond to "Dislike Very Much" and "Like Very Much" respectively, with a neutral mid point of 0 corresponding to "Neither Like Nor Dislike". For the purposes of this report any item scoring less than 0 is considered to be unacceptable. Results other than average acceptability are expressed as percentages, for example the respondents rating items -2 or -1 were grouped together to obtain an overall figure termed the "percent dislike".

From questions asked in various forms, the percentage who discarded or never ate each item (regarded as the same thing) was calculated. Questions were also asked regarding the packaging of the rations, and the results of the analyses are contained in tables and graphs. In order to keep the report and tabulations to a convenient size, the results reported have, for individual units and exercises, been restricted to mean acceptabilities only.

The items have been arranged in decreasing order of popularity, based on mean acceptability score, percentage dislike, and percentage discard.

As it was not possible to physically measure the amount of discarded ration pack components, reliance was placed on solicited answers to questionnaires to determine the amounts discarded.

Neither was it possible to verify the particular ration packing programmes of packs used on the exercise. However, the packing phases could be deduced, in part, from changes ratified by the Ration Scales Committee. For the purpose of this report, it was assumed that the ration packs referred to were drawn from the 1975/76 ration packing programme, unless otherwise stated. The contents sheets of each 24-hour one man ration type evaluated are shown in Annexes C and D.

TABLE 1

EXERCISE PARTICULARS

EXERCISE	DATES ATTENDED	LOCATION	UNITS SURVEYED	RATIONS EVALUATED*
Latin Forum	Nov 74	Shoalwater Bay, Qld	6 RAR	CRIM
Round Apple I	Apr 75	Cradle Mt, Tas	32 Sup Bn	PRIM
State Top	Jun 75	Cape York, Qld	4 Tpt Coy	PRIM
Anzac Trek	Aug 75	Central & West Aust	3 Sqn SASR, C Coy 8/9 RAR NZ Ranger Sqn, SAS	PRIM
OCS	Oct 75	Yarram, Vic	OCS	CRIM
Night Owl	Nov 75	High Range, Qld	1 RAR	CRIM
Jarrah Wood	Nov 75	Tianjara, NSW	RMC	CRIM
Apple Pioneer	Mar 76	Stony Head, Tas	2/15 Fd Regt, 6 Fd Regt 10 Mdm Regt, 132 Div Loc Bty 10 RSAR	CRIM
Quadrant Quail	May 76	Charters Towers, Qld	4 Fd Regt	CRIM
Rabbit Hop	May 76	Tianjara, NSW	8/12 Mdm Regt	CRIM
Big Country	Jun 76	Tindal, NT	2/4 RAR	CRIM
Best Day	Jul 76	Singleton, NSW	2 Cav Regt, 3 RAR, 5/7 RAR	CRIM
Swamp Fox	Aug 76	N.W. Aust	1 Sqn SASR	PRIM, CRIM
Round Apple II	Mar 77	Cradle Mt, Tas	32 Sup Bn	PRIM

* CRIM = Combat Ration (One Man)

PRIM = Patrol Ration (One Man)

PART A - PATROL RATION (ONE MAN)

RESULTS AND DISCUSSION

ANALYSIS OF DATA

From the overall data presented in Tables 2-5 it is quite clear that "Sweet and Sour Pork", "Instant Milk" and "Candy Creamy Fudge" are unacceptable. These items respectively were disliked by 45%, 48% and 56% of the respondents and discarded by 4%, 13% and 22% respectively.

The most striking features as seen in Table 3 relates to the freeze-dried (F.D.) composite main meals. Although, on the whole, these food items are not as readily discarded as the common item "snack" material (a feature which is also observed with canned main meals in the combat ration packs), they tend to show lower acceptability and are disliked to a greater extent.

The acceptability of the individual food items for the entire survey are also portrayed graphically in Figure 1.

When considered as a whole, greater emphasis ought to be placed on results in Table 4 which relate to Special Air Services (SAS) Regiment usage. SAS are the major users of this pack, accordingly other units are considered atypical users.

USER COMMENTS

The following are some unsolicited descriptive comments made by the users.

General

Comments were received from 79% of the respondents. The total quantity of food in the pack was considered to be:

Insufficient	—	12%
About right	—	51%
Too much	—	16%

Faults

F.D. meals: F.D. meals attracted most criticism. The majority of complaints related to the excessive water requirements (19%), the relatively long preparation time needed (7%), the difficulties associated with the reconstitution (4%), the apparent lack of flavour (4%), the excessive quantity of food per pouch (4%), with the associated bulk (1%), of the meal pouch as well as the adverse camouflage and flammability aspects of the packaging (1%).

In support of these statements, users stated that there were considerable problems associated with the use of this pack when operating in most parts of the country, particularly Northern and Central Australia, where water is scarce.

The explanation offered by those experiencing difficulty in reconstituting their meals, was attributed to the relatively large size of the meat pieces.

The meals were said to have either no flavour by some or the flavour experienced by others was considered monotonous no matter from what menu it was derived. Some likened the flavour to cardboard.

In support of the other criticisms it was pointed out that although the Patrol Ration is supposed to be a light weight ration, designed for limited resupply situations, the amount of food and the bulk of the package negated this principle when several day's rations had to be carried. Unless water was readily available, the extra water needed more than counter-balanced the weight savings. Tactically, the meal packages were considered too shiny for operational conditions.

Other Food Items: The Instant Milk Powder was criticised on the grounds that it did not reconstitute properly (2%). Lumps of milk either floated to the top of the "brew" or settled at the bottom of the canteen cup—in all making it unpleasant to drink the brew and difficult to clean the cup later on.

The Raspberry Crunch Biscuits were found to be too dry and crumbly (2%)—invariably the biscuits were broken on opening up their packets.

The Shortbread Biscuits were tainted with the flavour of its wrapper (1%). (Note: this taint is believed to have come not from the wrapper, but from the Spearmint chewing gum in the packs.)

It was stated that the Cheese Sticks had a peculiar taste which made them unpleasant to eat (1%).

The sugar packaging was inadequate because once opened there was a tendency for sugar to be scattered throughout the ration pack making other items sticky.

Suggested Improvements

Seventeen percent suggested the inclusion of dried fruit such as sultanas, raisins and dried apricots. 15% suggested the inclusion of canned fruit for example peaches and pears. It was stated that fruit would provide more variety to the ration pack as well as serving as a laxative.

Thirteen percent suggested replacing Candy Creamy Fudge with a chocolate block. It was stated that chocolate could either be eaten whole as a block or melted down to make a chocolate drink for those who dislike tea or coffee.

Eleven percent suggested the replacement of Instant Milk Powder with a tube of sweetened condensed milk because it was simple to use and it dissolved more easily than the milk powder.

Three percent requested packaging the sugar in small sachets as in the Combat Ration (One Man). They claimed that the sachets are simple to use and only the amount of sugar that is required is opened at any one time; whereas with cubed sugar, once the packet is opened, there is no way to stop the sugar from leaking through to the rest of the pack.

Three percent suggested that the Patrol Ration (One Man) should be similar to the U.S. Long Range Reconnaissance Pack (LRRP).

Three percent suggested the introduction of a variety of spices to the packs. It was claimed that these would provide more variety to the F.D. meals and so make them more palatable.

Two percent suggested the inclusion of a variety of soup powders so as to break the monotony of the meat meals.

Two percent recommended the inclusion of Vegemite which they claimed could be used both as a biscuit spread and as a soup stock.

One percent requested the introduction of a variety of sauces, such as tomato and Worcestershire to improve the flavour of the meat meals.

Two percent suggested the inclusion of turkey and chicken to break the monotony of the mainly beef based meals, whilst 1% suggested the inclusion of fish.

Two percent requested the introduction of a variety of sweets to the Patrol Ration (One Man) such as jubes and hard boiled sweets. They stated that sweets would be a most desirable source of energy and would also prevent the mouth from becoming dry in hot areas.

Two percent suggested the introduction of a third meal in lieu of cheese and biscuits, whilst 2% suggested replacing the sweet biscuits with a savoury type. 1% suggested replacing Raspberry Crunch Biscuits with Date Slice claiming that Date Slice would not break or

crumble as easily as the Raspberry Crunch Biscuits. Others suggested the inclusion of another snack meal in addition to cheese and biscuits and the main meal.

Two percent requested the introduction of Cereal Block or a cereal meal. They claimed that these items would make a welcome change from the meat meals as well as providing a more suitable breakfast meal. In addition they referred to the laxative properties of cereals.

One percent requested a reduction in size of the main meal to provide a smaller breakfast meal.

One percent requested the introduction of instant mash potato in lieu of the rice.

One percent requested the introduction of "Staminade" in lieu of the beverage base powders. Others suggested the incorporation of real fruit juice powder to overcome the bitter taste and thirst-provoking properties of the beverage base powders.

One percent requested the introduction of a variety of jams to the ration pack.

One percent suggested replacing the chewing gum with a block of chocolate.

One percent suggested the introduction of a resealable outer plastic bag to prevent the loss of smaller items.

RECOMMENDATIONS

It is recommended that changes to the Patrol Ration (One Man) are warranted as a result of the survey; wherever possible the users needs and wishes ought to be taken into account. Nevertheless, from the authors' experience with service personnel, it is felt that these changes should be accompanied by improved training in the use of this specialist Service equipment designed to perform a specific Service task.

The Patrol Ration, with its emphasis on dehydrated products, is causing some concern, especially when used in the arid parts of Australia. This concern is exemplified by SAS policy of issuing this ration in equal proportion with the Combat Ration (One Man) which contains, among other things, wet main meals packaged in rigid cans.

Hence in its present form, the Patrol Ration is of doubtful utility in the drier parts of Australia, because to effectively reduce the load which the Infantryman must carry, it relies on a ready supply of water for reconstitution.

It is recommended that this problem may be alleviated by the following measures:

- a. By providing in the Patrol Ration one freeze-dried meal, and one wet meal, the latter preferably packed in a flexible pouch.
- b. By reduction of the size of the freeze-dried meal.
- c. By using a greater proportion of vegetables in freeze-dried meals.

The latter changes would be expected to have the following beneficial effects:

1. Reduction in the amount of protein, which at present constitutes up to 66% by weight in some of the meals, would result in a concomitant decrease in the total water load required to handle the relatively toxic nitrogenous metabolites derived from protein digestion.
2. The fibre present in the vegetables is likely to have a beneficial effect on the health of the consumers.
3. The addition of vegetables would improve the variety of flavour in the packs.
4. The use of vegetables should reduce the cost of the meals.

Contrary to previous opinions regarding the popularity of "bite size" meals, this type of meal appears to be responsible for the incomplete reconstitution experienced by some users. The request for finely comminuted meals similar to those found in the U.S. LRRP packs seems to favour this view. The operational advantage of "instant" meals should take precedence.

The monotony of flavour could be alleviated by the provision of at least two more variety types such as D and E in the Combat Ration (One Man). Recipes based on fish and poultry should provide variation from the present predominantly beef based varieties. The inclusion of spices and sauces as nutritional adjuncts is strongly supported.

The packaging of the composite meals should be camouflaged.

It is very desirable that dried fruit or a fruit bar be included, provided that a product can be found satisfying the other requirements discussed previously such as a satisfactory shelf-life.

Consideration should be given to introducing a greater variety of biscuits especially in view of the almost limitless variety available on the market.

Instant mashed potato ought to be introduced in lieu of rice in at least some of the menus, for example Menu B, containing Roast Sliced Pork.

Although finding greater acceptance with SAS than other units, the existing beverage base powders leave much to be desired and efforts should be directed to find a more acceptable alternative.

The three items deemed to be unacceptable should be replaced. Partial implementation has occurred already with Candy Creamy Fudge being replaced by Chocolate, and Sweet and Sour Pork by Spaghetti Bolognaise. Fluid milk packaged in a tube ought to be the replacement for Instant Milk Powder.

All these changes should be incorporated in mock-up packs which should then be the subject of further field evaluation.

TABLE 2

PATROL RATION (ONE MAN) QUESTIONNAIRE RESULTS All Data Combined

No. of Subjects = 352 Average Age = 25.87 S.D. = 5.88 Av Yrs Service = 6.16 S.D. = 4.72 % Married = 47.0

ITEMS	ACCEPTABILITY				AMOUNT						PACKAGING					
	Acceptability Score		%Dis-like	%Not tried	%Not replied	%Alright	%Not enough	%Too much	%Dis-card	%Not replied	%Alright	%Too shiny	%Too crackly	%Too flimsy	%Not replied	
	Mean	S.D.														
Shortbread Biscuits	0.71	1.32	20	2	2	51	6	4	9	31	49	2	6	22	22	
Raspberry Crunch Biscuits	1.07	1.18	11	4	3	47	12	6	7	27	43	2	2	29	24	
Processed Cheese	1.21	1.11	9	4	3	29	16	6	4	33	45	10	0	22	24	
Chewing Gum	0.96	1.18	11	4	4	51	4	4	4	37	61	8	4	4	24	
Candy Creamy Fudge	-0.51	1.55	56	5	4	24	6	10	22	27	67	0	6	6	22	
Instant Milk	-0.22	1.53	48	5	3	24	4	8	13	33	51	12	2	16	20	
Sugar	1.28	1.06	7	4	5	31	6	25	5	25	31	14	10	20	25	
Tea Bags	1.26	1.17	9	5	2	35	22	2	3	37	67	4	4	2	24	
Instant Coffee	1.28	1.18	11	4	2	35	16	4	4	33	65	6	2	4	24	
Salt	1.24	0.98	4	7	5	49	10	4	2	29	67	8	2	2	22	
Freeze Dried Rice	0.56	1.30	22	8	5	51	0	8	6	29	61	2	6	4	27	
Orange Fruit Juice Powder	0.56	1.49	26	7	1	35	8	2	9	35	67	6	2	2	24	
Lemon Fruit Juice Powder	0.58	1.51	27	6	1	31	14	2	7	39	67	6	2	2	24	
Lime Fruit Juice Powder	0.50	1.51	29	5	1	29	24	0	5	33	48	10	5	0	38	
Beef and Onions	0.79	1.28	17	7	1	61	4	14	1	20	35	43	8	2	12	
Savoury Steak Fingers	0.91	1.24	16	5	1	61	6	12	1	22	37	39	8	2	14	
Beef and Beans	0.96	1.15	12	6	1	59	4	12	1	24	33	43	8	2	14	
Roast Sliced Pork	1.05	1.28	16	7	1	57	6	10	2	22	33	41	8	2	16	
Sweet and Sour Pork	-0.07	1.61	45	4	1	48	5	10	4	14	5	76	0	5	14	
Lamb and Vegetable Curry	0.72	1.46	23	5	1	52	10	10	2	24	5	76	5	0	14	

Overall Average = 0.75

As the "% Discard" values in the ninth column of the table are a composite of the figures recorded as such on cards and the records of "Never eat" and listed discarded items on pamphlet questionnaires, the figures in the central block may not add to 100%.

TABLE 3
PATROL RATION (ONE MAN)
PREFERENCE RATINGS

ACCEPTABILITIES	DISLIKES	DISCARDS
<p>Mean Score</p> <p>Sugar 1.3</p> <p>Tea Bags 1.3</p> <p>Instant Coffee 1.3</p> <p>Salt 1.2</p> <p>Processed Cheese 1.2</p> <p>Raspberry Crunch Biscuits 1.1</p> <p>Chewing Gum 1.0</p> <p>Beef and Beans 1.0</p> <p>Roast Sliced Pork 1.0</p> <p>Savoury Steak Fingers 0.9</p> <p>Beef and Onions 0.8</p> <p>Shortbread Biscuits 0.7</p> <p>Lamb and Vegetable Curry 0.7</p> <p>Freeze Dried Rice 0.6</p> <p>Orange Fruit Juice Powder 0.6</p> <p>Lemon Fruit Juice Powder 0.6</p> <p>Lime Fruit Juice Powder 0.5</p> <p>Sweet and Sour Pork -0.1</p> <p>Instant Milk -0.2</p> <p>Candy Creamy Fudge -0.5</p>	<p>Salt 4</p> <p>Sugar 7</p> <p>Tea Bags 9</p> <p>Processed Cheese 9</p> <p>Instant Coffee 11</p> <p>Raspberry Crunch Biscuits 11</p> <p>Chewing Gum 11</p> <p>Beef and Beans 12</p> <p>Roast Sliced Pork 16</p> <p>Savoury Steak Fingers 16</p> <p>Beef and Onions 17</p> <p>Shortbread Biscuits 20</p> <p>Freeze Dried Rice 22</p> <p>Lamb and Vegetable Curry 23</p> <p>Orange Fruit Juice Powder 26</p> <p>Lemon Fruit Juice Powder 27</p> <p>Lime Fruit Juice Powder 29</p> <p>Sweet and Sour Pork 45</p> <p>Instant Milk 48</p> <p>Candy Creamy Fudge 56</p>	<p>Beef and Beans 1</p> <p>Savoury Steak Fingers 1</p> <p>Beef and Onions 1</p> <p>Salt 2</p> <p>Roast Sliced Pork 2</p> <p>Lamb and Vegetable Curry 2</p> <p>Tea Bags 3</p> <p>Instant Coffee 4</p> <p>Processed Cheese 4</p> <p>Chewing Gum 4</p> <p>Sweet and Sour Pork 4</p> <p>Sugar 5</p> <p>Lime Fruit Juice Powder 5</p> <p>Freeze Dried Rice 6</p> <p>Raspberry Crunch Biscuits 7</p> <p>Lemon Fruit Juice Powder 7</p> <p>Shortbread Biscuits 9</p> <p>Orange Fruit Juice Powder 9</p> <p>Instant Milk 13</p> <p>Candy Creamy Fudge 22</p>

TABLE 4
PATROL RATION (ONE MAN)
SAS SUMMARY ACCEPTABILITY RESULTS

Exercise Unit	Anzac Trek 3 Sqn	Swamp Fox 1 Sqn	Overall Total
No of Subjects	33	21	54
Average Age	27	28	27
Average Years of Service	8	8	8
% Married	79	67	74
Shortbread Biscuits	0.72	0.45	0.62
Raspberry Crunch Biscuits	0.69	0.61	0.66
Processed Cheese	1.49	0.67	1.18
Chewing Gum	0.97	0.81	0.91
Candy Creamy Fudge	-0.36	-1.20	-0.67
Instant Milk	-0.56	-1.21	-0.80
Sugar	1.12	1.12	1.12
Tea Bags	1.00	1.57	1.21
Instant Coffee	1.03	1.00	1.02
Salt	1.11	1.53	1.27
Freeze Dried Rice	0.44	0.81	0.57
Orange Fruit Juice Powder	1.38	0.89	1.20
Lemon Fruit Juice Powder	1.35	1.22	1.30
Lime Fruit Juice Powder	1.29	1.11	1.23
Beef and Onions	0.60	0.15	0.43
Savoury Steak Fingers	0.54	0.65	0.58
Beef and Beans	0.97	0.55	0.82
Roast Sliced Pork	0.69	0.35	0.56
Sweet and Sour Pork	0.25	-0.11	0.12
Lamb and Vegetable Curry	0.92	0.95	0.93
Overall Average	0.78	0.60	0.71

TABLE 5

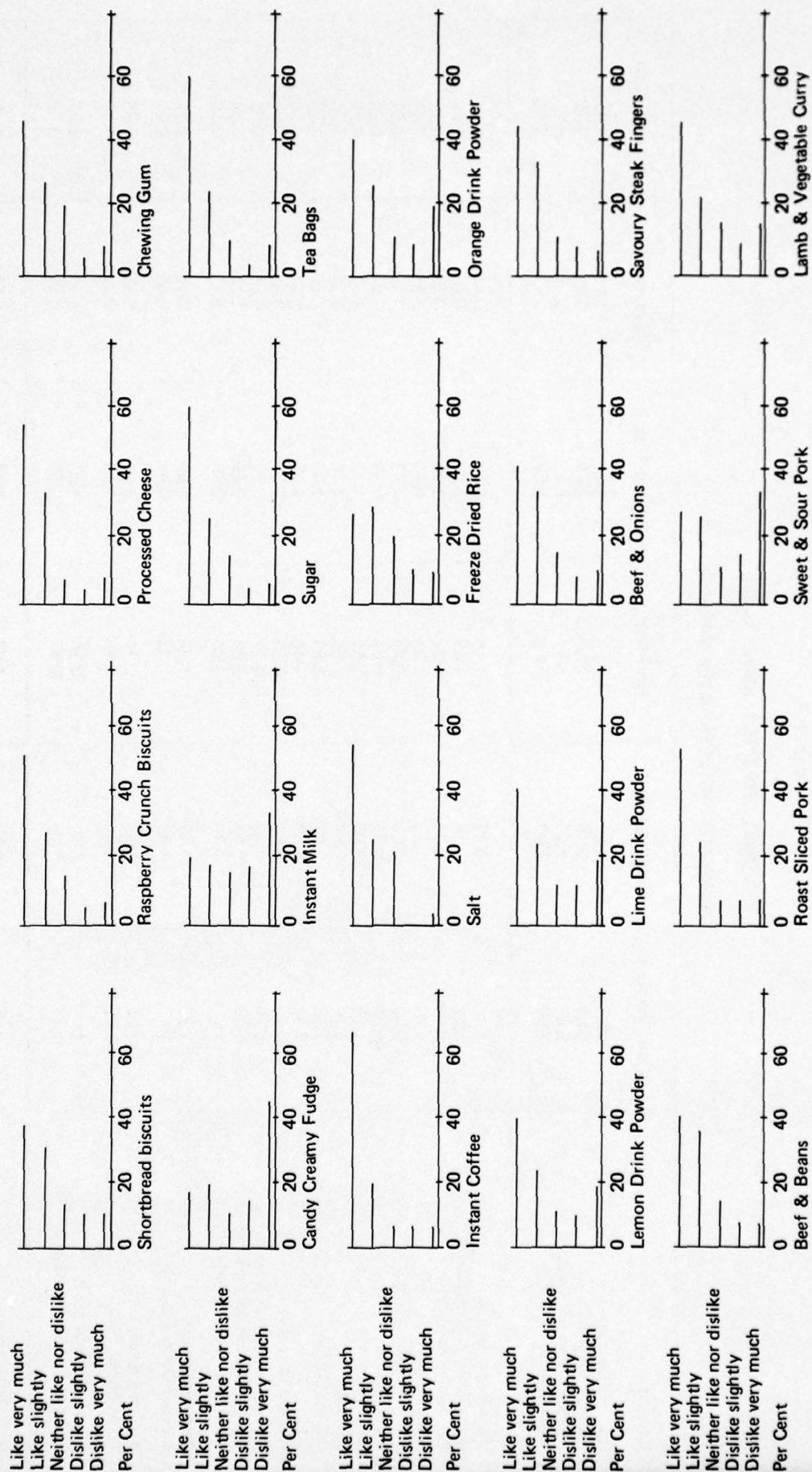
PATROL RATION (ONE MAN)

SUMMARY ACCEPTABILITY RESULTS

Exercise	Round Apple 1	Round Apple II	State Top	Anzac Trek	Swamp Fox	Overall Total
No. of Subjects	23	30	71	185	21	330
Average Age	24.8	26.5	27.7	25.0	28.0	25.9
Average Years of Service	5.4	7.0	5.7	6.1	7.7	6.2
% Married	****	73.3	54.9	43.2	66.7	50.5
Shortbread Biscuits	1.14	0.93	1.15	0.48	0.45	0.71
Raspberry Crunch Biscuits	1.33	1.28	1.43	0.90	0.61	1.07
Processed Cheese	****	0.07	1.61	1.28	0.67	1.21
Chewing Gum	1.41	1.11	1.33	0.76	0.81	0.96
Candy Creamy Fudge	0.63	0.65	-0.25	-0.82	-1.20	-0.51
Instant Milk	-0.38	-0.26	0.61	-0.44	-1.21	-0.22
Sugar	1.26	1.46	1.51	1.17	1.12	1.28
Tea Bags	1.70	1.48	1.20	1.16	1.57	1.26
Instant Coffee	1.50	1.63	1.68	1.06	1.00	1.28
Salt	1.32	1.50	1.45	1.10	1.53	1.24
Freeze Dried Rice	0.29	0.44	0.60	0.56	0.81	0.56
Orange Fruit Juice Powder	0.29	0.42	0.70	0.52	0.89	0.56
Lemon Fruit Juice Powder	0.35	0.27	0.80	0.49	1.22	0.58
Lime Fruit Juice Powder	****	0.00	0.72	0.35	1.11	0.50
Beef and Onions	1.33	1.18	1.22	0.56	0.15	0.79
Savoury Steak Fingers	1.47	1.30	1.25	0.67	0.65	0.91
Beef and Beans	1.24	0.93	1.24	0.86	0.55	0.96
Roast Sliced Pork	0.05	1.31	1.47	1.02	0.35	1.05
Sweet and Sour Pork	****	****	0.36	-0.23	-0.11	-0.07
Lamb and Vegetable Curry	1.14	****	0.89	0.57	0.95	0.72
Overall Average	0.95	0.87	1.05	0.60	0.60	0.75

FIGURE 1

GRAPHIC PRESENTATION OF INDIVIDUAL ACCEPTABILITIES



PART B - COMBAT RATION (ONE MAN)

RESULTS AND DISCUSSION

ANALYSIS OF DATA

From the overall data presented in Tables 6-9, it is quite clear that the items "Cereal Block", "Survival Biscuits" and "Candy Creamy Fudge" are unacceptable. These items respectively were disliked by 45%, 45% and 49% of the respondents and discarded by 36%, 21% and 41% respectively.

Other items showing both low acceptability and low popularity are the beverage base powders and some of the main meal components, namely the solid meat packs and meat and egg combinations.

As in the case of the Patrol Ration, although the canned main meals show a somewhat low acceptability profile when compared with the other components, they do not appear to be discarded as frequently.

The acceptability of the individual items is illustrated also in graphical form in Figure 2.

As in the case of the Patrol Ration greater emphasis ought to be placed on results in Table 7 which relate to Infantry usage; this Corps being by far the predominant user of this pack. It should be noted that generally there is little difference between the responses of the battalions as indeed between all units surveyed.

USER COMMENTS

The following are a summary of unsolicited descriptive comments made by users. These were received from 88% of the respondents.

Faults

Canned Meals: The main meals attracted criticism from 14% of the respondents, which makes the meals a major target for criticism. The chief objection was the "poor quality" of the products, an expression which referred to the monotony of flavour, poor texture and unappetising appearance, as exemplified by the excess fat, gristle, blood vessels and sinews. In particular, both the solid meat packs and meat and egg combinations were criticised for the lack of vegetables; as well as the former for the similarity of varieties (corned beef, luncheon meat and camp pie) and the latter for the flat burnt flavour.

Other food items: Seven percent stated that the Survival Biscuits were too hard, tasteless, dry and tainted with the packaging taste. (Refer to comments on biscuits in the Patrol Ration.)

Six percent criticised the Shortbread Biscuits on the same grounds with the further statement that these biscuits were easily crushed.

Four percent stated that the Candy Creamy Fudge was far too sweet and sickly, and 2% were critical of the amount of sweets in the pack.

Four percent expressed dissatisfaction with the sugar packaging stating that the package was too flimsy.

Three percent were dissatisfied with the packaging of the tubed products on the grounds that these were easily punctured.

Two percent of the respondents who commented unfavourably on the Cereal Blocks found them too dry and tasteless. Furthermore, they took too long to prepare and required too much milk when used as a breakfast cereal.

Two percent who commented on the Beverage Base Powders criticised them on the grounds of their bitterness and thirst-provoking qualities. It was also stated that the recommended made-up concentration was too dilute and that there was a soapy taste associated with the products.

One percent criticised the rice on the grounds of the relatively long preparation times required and the excessive water required for this purpose.

Suggested Improvements

The majority (51%) favoured the reintroduction of varieties of canned fruits.

Fifteen percent requested the addition of a variety of spices and flavourings in order to improve the palatability of the canned meats.

Ten percent requested a larger quantity of "brew material" (coffee, tea, condensed milk, sugar).

Nine percent requested a greater variety of main meals which are at present mainly beef based. Suggested varieties include fish (salmon, sardines, tuna), chicken, turkey, baked beans and spaghetti.

Seven percent requested the introduction of an instant chocolate drink for those who dislike tea and/or coffee. They suggested drinking chocolate, "Milo", "Ovaltine" as alternatives.

Seven percent requested the reinclusion of rice in every pack.

Six percent sought an increase in the quantity of the main meals, either by increasing the size of the present cans, or the introduction of a third can.

Six percent requested the introduction of a variety of spreads such as "Vegemite", beef paste, honey, peanut butter and margarine.

Five percent requested a more acceptable variety of sweets such as "Minties", "Cheers", "Smarties", "Life Savers", barley sugar, butterscotch, fruit pastilles and jelly beans.

Five percent requested the introduction of a greater variety of sweet biscuits.

Four percent requested the inclusion of instant mashed potato in every pack. It was stated that the favourable features associated with this product include the highly acceptable flavour and the quick and easy preparation.

Four percent suggested the inclusion of a variety of dehydrated meals.

Two percent requested the inclusion of a variety of dried fruits such as raisins, sultanas and apricots.

One percent requested the introduction of a compressed fruit and nut bar in lieu of Candy Creamy Fudge.

One percent suggested that all canned meats should contain more vegetables to make them more palatable.

One percent requested a different variety of chewing gum—the varieties to be in pellet form which would not stick to the wrapper.

RECOMMENDATIONS

As in the case of the Patrol Ration (One Man) it is recommended that changes to the Combat Ration (One Man) are warranted as a result of the survey and that wherever practicable the users' needs and wishes should be considered. Again, as in the case of the Patrol Ration, it is quite obvious that there is a concomitant need to educate the user on the use of this specialist Service equipment.

On the whole, the Combat Ration (One Man) appears to be quite satisfactory for the task for which it was designed. The suggested improvements would not drastically alter the nature of the pack.

Already some preliminary changes have been made, and in most cases, these seem to be in line with user aspirations. These changes include the deletion of Candy Creamy Fudge and its replacement with Butterscotch. The problem associated with the low popularity for

Survival Biscuits has been approached by the deletion of one of the two packets and the introduction of a tube of Butter Concentrate to each pack to improve the palatability of the remaining Survival Biscuits by providing a spread. In addition, butter also has versatility in that it can be used as a cooking compound. Finally, the introduction of butter concentrate was important for making up the energy deficit caused by the reintroduction of canned fruit which although relatively low in energy (because of the relatively high water content) is highly popular.

Other improvements include the introduction of Potato with Onion Powder to varieties D and E. The Spearmint flavoured chewing gum had been the cause of some concern because of the pungent nature of the Spearmint flavour. It was claimed that the flavour contaminated the other components in the pack, upsetting their flavours. This has now been replaced by "PK" in pellet form, though there would be no nutritional loss if chewing gum were eliminated.

The implementation of further recommendations indicated below should further improve the packs. Of paramount importance is the requirement for a survey to be undertaken of available, and potentially available, composite meal cans; especially those which are not predominantly beef-flavoured, as possible replacements for the less popular meals. A similar survey of biscuits would be equally valuable.

As in the case of the Patrol Ration, the inclusion of spices and flavourings should further improve the palatability of many of the meals. These could either be packaged in tubes where in a fluid form or in sachets where available dry.

The Cereal Block is acknowledged as an item of low acceptability and its replacement with a "muesli" type fruit and nut bar should be investigated.

The current variety of beverage based powders should be replaced with fruit juice powders, as suggested for the Patrol Ration.

In conclusion, these changes should be incorporated in mock-up packs for further field evaluation as to their suitability.

ACKNOWLEDGEMENTS

The authors are grateful for the co-operation given by the troops and their commanders on all the trials.

Mr. D. Dunkley's assistance with the analysis of the questionnaires is gratefully acknowledged.

TABLE 6

COMBAT RATION (ONE MAN) QUESTIONNAIRE

*All

No. of Subjects = 2112 Average Age = 23.85 S.D. = 5.90 Av Yrs Service = 4.69 S.D. = 4.81 % Married =

ITEMS	ACCEPTABILITY					AMOUNT					PAC	
	Acceptability Score		%Dis-like	%Not tried	%Not replied	% Alright	%Not sufficient	%Too much	%Dis-card	%Not replied	% Alright	%Too shiny
	Mean	S.D.										
Cereal Block	-0.19	1.48	45	2	1	41	6	7	36	11	76	2
Survival Biscuits	-0.31	1.36	45	1	1	44	18	6	21	11	72	2
Sweet Biscuits	0.84	1.27	17	1	2	51	5	25	7	12	63	1
Cheese	1.60	0.80	3	0	1	35	0	53	2	10	69	18
Chocolate	1.06	1.18	12	0	1	59	5	19	6	12	63	9
Chewing Gum	0.93	1.19	12	2	1	54	2	17	15	12	67	13
Candy Creamy Fudge	-0.28	1.60	49	2	2	29	12	7	41	11	74	2
Sweetened Condensed Milk	1.66	0.74	2	1	1	37	1	50	2	10	76	1
Sugar	1.63	0.76	2	2	2	49	12	26	3	9	56	6
Tea Bags	1.32	1.11	9	3	2	45	4	32	9	10	75	4
Instant Coffee	1.54	0.98	7	1	1	37	2	48	3	9	80	3
Salt	1.22	0.97	3	7	3	69	5	7	8	11	82	2
Instant Rice	1.16	1.14	10	4	2	54	3	24	9	10	81	1
Curry Powder	0.81	1.36	17	8	2	56	4	15	15	10	80	3
Orange Fruit Juice Powder	0.46	1.51	27	5	1	46	3	12	28	10	74	3
Lemon Fruit Juice Powder	0.41	1.52	28	5	2	45	4	12	29	10	74	2
Lime Fruit Juice Powder	0.33	1.54	31	5	2	45	4	12	29	10	74	2
Ham and Eggs	0.57	1.46	25	3	1	38	2	36	13	10	52	35
Plum Jam	1.00	1.08	9	4	2	59	2	18	10	11	78	1
Beef and Vegetables	1.32	0.99	7	2	1	49	1	37	2	10	54	34
Pork and Beans	1.09	1.22	13	3	2	37	2	44	5	11	53	33
Raspberry Jam	1.12	1.07	8	3	2	59	3	19	9	11	78	1
Corned Beef Hash	0.68	1.41	23	2	2	51	6	24	8	11	53	34
Camp Pie	0.51	1.44	27	3	2	42	6	30	11	11	53	33
Apricot Jam	1.02	1.13	10	3	2	58	2	18	10	12	77	2
Beef and Gravy	1.06	1.25	14	1	2	49	3	31	6	11	53	33
Sausages and Vegetables	0.87	1.40	20	2	2	38	2	40	8	11	54	33
Blackberry Jam	1.11	1.10	9	4	2	58	2	20	9	12	78	1
Beef Soup Powder	1.07	1.12	9	9	2	50	2	23	11	14	75	4
Luncheon Meat	0.41	1.50	29	1	2	45	7	23	14	12	53	33
Beef and Egg	0.52	1.48	26	3	2	42	2	30	12	14	52	33
Peach Jam	0.97	1.13	10	5	2	56	2	17	12	14	77	1
Chicken Soup Powder	1.14	1.11	9	8	2	49	2	24	10	14	74	4
Corned Beef	0.40	1.57	30	1	2	45	6	22	14	13	53	32

Overall Average = 0.86

* Does not include Exercise Latin Forum (74/75 RPP)

***All Data Combined**

.81 % Married = 40.2

PACKAGING				
% Alright	%Too shiny	%Too crackly	%Too flimsy	%Not replied
76	2	6	3	14
72	2	8	6	13
63	1	7	15	13
69	18	1	1	13
63	9	11	3	15
67	13	3	2	14
74	2	3	4	16
76	1	0	9	13
56	6	6	19	14
75	4	5	2	14
80	3	1	2	14
82	2	1	1	14
81	1	3	1	14
80	3	1	1	14
74	3	1	6	16
74	2	2	6	16
74	2	2	6	16
52	35	0	0	12
78	1	0	7	13
54	34	0	0	12
53	33	0	0	13
78	1	1	7	13
53	34	0	0	13
53	33	0	0	13
77	2	1	7	14
53	33	0	0	13
54	33	0	0	13
78	1	0	7	14
75	4	1	4	15
53	33	0	1	14
52	33	0	0	15
77	1	0	6	15
74	4	1	4	16
53	32	0	1	14

TABLE 7
COMBAT RATION (ONE MAN) QUESTIONNAIRE

*All D

PREFERENCE RATINGS

ACCEPTABILITIES	(Mean Score)	DISLIKES	(%)	DISCAR
Sweetened Condensed Milk	1.7	Sweetened Condensed Milk	2	Sweetened Condensed M
Sugar	1.6	Sugar	2	Cheese
Cheese	1.6	Cheese	3	Beef and Vegetables
Instant Coffee	1.5	Salt	3	Sugar
Beef and Vegetables	1.3	Instant Coffee	7	Instant Coffee
Tea Bags	1.3	Beef and Vegetables	7	Pork and Beans
Salt	1.2	Raspberry Jam	8	Chocolate
Instant Rice	1.2	Tea Bags	9	Beef and Gravy
Raspberry Jam	1.1	Blackberry Jam	9	Sweet Biscuits
Blackberry Jam	1.1	Chicken Soup Powder	9	Salt
Chicken Soup Powder	1.1	Beef Soup Powder	9	Sausages and Vegetables
Beef Soup Powder	1.1	Plum Jam	9	Corned Beef Hash
Chocolate	1.1	Instant Rice	10	Tea Bags
Pork and Beans	1.1	Apricot Jam	10	Instant Rice
Beef and Gravy	1.1	Peach Jam	10	Raspberry Jam
Plum Jam	1.0	Chocolate	12	Blackberry Jam
Apricot Jam	1.0	Chewing Gum	12	Chicken Soup Powder
Peach Jam	1.0	Pork and Beans	13	Plum Jam
Chewing Gum	0.9	Beef and Gravy	14	Apricot Jam
Sausages and Vegetables	0.9	Sweet Biscuits	17	Beef Soup Powder
Sweet Biscuits	0.8	Curry Powder	17	Camp Pie
Curry Powder	0.8	Sausages and Vegetables	20	Peach Jam
Corned Beef Hash	0.7	Corned Beef Hash	23	Beef and Egg
Ham and Eggs	0.6	Ham and Eggs	25	Ham and Eggs
Beef and Egg	0.5	Beef and Egg	26	Luncheon Meat
Camp Pie	0.5	Camp Pie	27	Corned Beef
Orange Fruit Juice Powder	0.5	Orange Fruit Juice Powder	27	Chewing Gum
Lemon Fruit Juice Powder	0.4	Lemon Fruit Juice Powder	28	Curry Powder
Luncheon Meat	0.4	Luncheon Meat	29	Survival Biscuits
Corned Beef	0.4	Corned Beef	30	Orange Fruit Juice Powder
Lime Fruit Juice Powder	0.3	Lime Fruit Juice Powder	31	Lemon Fruit Juice Powder
Cereal Block	-0.2	Cereal Block	45	Lime Fruit Juice Powder
Survival Biscuits	-0.3	Survival Biscuits	45	Cereal Block
Candy Creamy Fudge	-0.3	Candy Creamy Fudge	49	Candy Creamy Fudge

* Does not include Exercise Latin Forum (74/75 RPP)

***All Data Combined**

DISCARDS	(%)
Sweetened Condensed Milk	2
Cheese	2
Beef and Vegetables	2
Sugar	3
Instant Coffee	3
Pork and Beans	5
Chocolate	6
Beef and Gravy	6
Sweet Biscuits	7
Salt	8
Sausages and Vegetables	8
Corned Beef Hash	8
Tea Bags	9
Instant Rice	9
Raspberry Jam	9
Blackberry Jam	9
Chicken Soup Powder	10
Plum Jam	10
Apricot Jam	10
Beef Soup Powder	11
Camp Pie	11
Peach Jam	12
Beef and Egg	12
Ham and Eggs	13
Luncheon Meat	14
Corned Beef	14
Chewing Gum	15
Curry Powder	15
Survival Biscuits	21
Orange Fruit Juice Powder	28
Lemon Fruit Juice Powder	29
Lime Fruit Juice Powder	29
Cereal Block	36
Candy Creamy Fudge	41

TABLE 8
COMBAT RATION (ONE MAN)
SUMMARY ACCEPTABILITY RESULTS — BY BATTALIONS

Unit	1 RAR	2/4 RAR	3 RAR	5/7 RAR	*6 RAR	8/9
Number of Subjects	317	321	76	282	183	10
Average Age (Years)	21.94	22.70	25.59	23.30	23.72	22
Average Service (Years)	3.24	4.08	6.25	4.03	4.51	4.1
Percent Married	20	31	53	41	****	30
Cereal Block	-0.82	-0.21	-0.86	-0.24	-0.93	-0.1
Survival Biscuits	-1.02	-0.21	-0.10	-0.21	-0.94	-0.1
Sweet Biscuits	0.25	1.04	0.99	1.19	0.86	0.1
Cheese	1.47	1.65	1.82	1.65	1.23	1.1
Chocolate	0.79	1.03	0.94	1.04	0.54	0.1
Chewing Gum	1.03	0.74	1.06	0.83	0.86	0.1
Candy Creamy Fudge	-0.44	-0.89	-0.60	-0.15	****	-1.1
Sweetened Condensed Milk	1.70	1.82	1.68	1.78	1.54	1.1
Sugar	1.75	1.81	1.69	1.76	****	1.1
Tea Bags	1.29	1.37	1.41	1.23	1.19	1.1
Instant Coffee	1.52	1.68	1.68	1.74	1.54	1.1
Salt	1.31	1.25	1.38	1.22	****	1.1
Instant Rice	1.22	1.49	0.86	1.17	0.49	0.1
Curry Powder	0.86	1.01	1.21	0.97	0.90	0.1
Orange Fruit Juice Powder	0.36	0.69	-0.36	-0.43	****	-0.1
Lemon Fruit Juice Powder	0.40	0.47	-0.54	-0.41	****	-0.1
Lime Fruit Juice Powder	0.42	0.57	-0.56	-0.51	****	-0.1
Ham and Eggs	0.07	0.29	0.51	0.55	0.09	0.1
Plum Jam	0.77	1.00	0.99	0.96	0.40	0.1
Beef and Vegetables	1.19	1.39	1.31	1.38	****	1.1
Pork and Beans	0.95	1.13	1.20	1.19	0.63	1.1
Raspberry Jam	0.85	1.15	1.00	1.09	0.60	0.1
Corned Beef Hash	0.21	0.77	0.39	0.77	0.44	0.1
Camp Pie	0.43	0.51	0.58	0.54	0.84	0.1
Apricot Jam	0.84	1.00	0.90	0.91	0.46	0.1
Beef and Gravy	0.63	1.08	0.82	1.11	0.71	1.1
Sausages and Vegetables	0.64	0.64	1.16	1.00	0.57	0.1
Blackberry Jam	0.84	1.16	0.99	0.96	0.69	0.1
Beef Soup Powder	0.90	0.95	1.04	0.98	****	0.1
Luncheon Meat	0.13	0.27	0.30	0.44	0.47	0.1
Beef and Egg	-0.05	0.37	0.57	0.67	0.32	0.1
Peach Jam	0.79	0.98	0.94	0.81	0.39	0.1
Chicken Soup Powder	0.95	1.08	1.16	1.00	1.19	1.1
Corned Beef	-0.62	0.27	-0.20	0.48	-0.15	0.1
Battalion Averages	0.64	0.86	0.74	0.81	0.57	0.1

* 6 RAR were issued with 74/75 RPP

LIONS

*6 RAR	8/9 RAR	All Battalions
183	104	1283
23.72	22.77	22.97
4.51	4.07	4.05
****	30	32
-0.93	-0.89	-0.57
-0.94	-0.66	-0.54
0.86	0.40	0.80
1.23	1.49	1.54
0.54	0.75	0.87
0.86	0.85	0.88
****	-1.20	-0.50
1.54	1.54	1.71
****	1.62	1.50
1.19	1.10	1.28
1.54	1.52	1.62
****	1.26	1.09
0.49	0.94	1.13
0.90	0.74	0.94
****	-0.00	0.14
****	-0.01	0.10
****	-0.04	0.10
0.09	0.64	0.30
0.40	0.77	0.83
****	1.28	1.12
0.63	1.14	1.03
0.60	0.99	0.96
0.44	0.64	0.55
0.84	0.66	0.56
0.46	0.80	0.84
0.71	1.17	0.91
0.57	0.71	0.74
0.69	0.95	0.94
****	0.98	0.82
0.47	0.53	0.32
0.32	0.63	0.36
0.39	0.70	0.79
1.19	1.13	1.05
-0.15	0.16	0.00
0.57	0.69	0.71

2

TABLE 9
COMBAT RATION (ONE MAN)

SUMMARY ACCEPTABILITY RESULTS - ALL UNITS SURVEYED

Exercise	A	B	C	D	E	F	G	H	I	J
No. of Subjects	183	202	126	378	298	107	113	12	20	356
Average Age	23.98	25.11	22.76	21.87	20.74	28.83	29.46	22.67	25.05	22.93
Average Years of Service	4.56	6.17	4.11	3.20	2.98	6.08	8.50	4.58	5.15	4.19
% Married	**	44	36	20	40	68	75	25	70	32
Cereal Block	-0.93	-0.43	0.78	-0.80	0.27	-0.06	0.38	-0.42	-1.26	-0.26
Survival Biscuits	-0.94	-0.48	0.06	-1.06	-0.21	0.14	0.22	-0.08	-0.22	-0.20
Sweet Biscuits	0.86	0.46	1.29	0.32	0.66	1.35	1.14	0.83	1.13	1.02
Cheese	1.23	1.43	1.65	1.43	1.60	1.75	1.72	1.67	1.71	1.66
Chocolate	0.54	0.74	1.59	0.74	1.20	1.58	1.29	1.17	1.21	1.03
Chewing Gum	0.86	0.84	1.13	0.98	0.86	1.32	1.11	1.42	1.39	0.76
Candy Creamy Fudge	****	-0.82	0.81	-0.47	0.08	0.89	-0.01	-1.08	-0.33	-0.92
Sweetened Condensed Milk	1.54	1.52	1.67	1.67	1.63	1.53	1.53	1.42	1.47	1.81
Sugar	****	1.45	1.64	1.71	1.50	1.58	1.47	1.17	1.65	1.78
Tea Bags	1.19	1.34	1.11	1.27	1.41	1.64	1.24	0.73	1.41	1.37
Instant Coffee	1.54	1.24	1.47	1.46	1.33	1.82	1.72	1.67	1.50	1.68
Salt	****	1.26	1.16	1.28	0.96	1.48	1.22	1.80	1.18	1.24
Instant Rice	0.49	0.87	1.17	1.16	1.24	0.97	1.05	0.64	1.06	1.47
Curry Powder	0.90	0.78	0.81	0.80	0.28	0.70	0.98	0.10	0.56	1.02
Orange Fruit Juice Powder	****	0.53	-0.11	0.37	1.08	0.98	0.65	0.33	0.73	0.70
Lemon Fruit Juice Powder	****	0.48	-0.11	0.45	1.11	0.93	0.52	0.25	0.20	0.49
Lime Fruit Juice Powder	****	0.52	-0.12	0.44	1.09	0.79	0.63	-0.17	0.00	0.59
Ham and Eggs	0.09	0.67	0.72	0.03	0.26	0.95	0.95	1.17	1.35	0.29
Plum Jam	0.40	0.77	1.11	0.77	1.06	1.62	1.34	1.00	1.29	0.96
Beef and Vegetables	****	1.06	1.41	1.20	1.28	1.52	1.57	1.25	0.95	1.35
Pork and Beans	0.63	1.03	0.94	0.95	1.06	1.32	1.31	1.27	0.80	1.11
Raspberry Jam	0.60	0.91	1.27	0.84	1.20	1.76	1.40	1.33	1.35	1.12
Corned Beef Hash	0.44	0.66	0.95	0.21	0.73	1.04	1.12	-0.36	0.55	0.75
Camp Pie	0.84	0.49	0.55	0.47	0.20	1.05	0.75	0.25	0.15	0.52
Apricot Jam	0.46	0.81	1.08	0.80	1.07	1.67	1.47	0.82	1.22	0.96
Beef and Gravy	0.71	0.81	1.38	0.64	1.41	1.34	1.57	-0.67	0.42	1.03
Sausages and Vegetables	0.57	0.70	1.04	0.66	0.71	1.48	1.33	1.00	1.05	0.65
Blackberry Jam	0.69	0.91	1.27	0.84	1.19	1.70	1.46	1.09	1.41	1.13
Beef Soup Powder	****	0.84	1.24	0.92	1.19	1.32	1.47	1.00	1.38	0.98
Luncheon Meat	0.47	0.46	0.82	0.14	0.16	1.17	0.95	-0.42	0.47	0.29
Beef and Egg	0.32	0.63	1.03	-0.03	0.32	1.19	1.14	1.00	1.11	0.37
Peach Jam	0.39	0.71	1.09	0.77	1.07	1.55	1.35	0.70	1.41	0.95
Chicken Soup Powder	1.19	1.04	1.33	0.96	1.21	1.49	1.44	1.50	1.65	1.11
Corned Beef	-0.15	0.45	1.05	-0.55	0.63	1.27	1.31	-0.08	0.55	0.29
Exercise Averages	0.57	0.73	1.01	0.63	0.91	1.26	1.14	0.69	0.92	0.86

LEGEND:-

A - Latin Forum (74/75 RPP issued)
B - Anzac Trek
C - OCS, Yarram
D - Night Owl

E - Jarrah Wood
F - Apple Pioneer
G - Maiden Magpie
H - Quadrant Quail

I - Rabbit Hop
J - Big Country
K - Best Day
L - Swamp Fox

SURVEYED

H	I	J	K	L	Overall
2	20	356	365	39	2199
2.67	25.05	22.93	23.73	27.05	23.57
.58	5.15	4.19	4.46	7.51	4.49
5	70	32	43	54	38
.42	-1.26	-0.26	-0.35	-0.65	-0.28
.08	-0.22	-0.20	-0.20	0.00	-0.39
.83	1.13	1.02	1.14	0.37	0.83
.67	1.71	1.66	1.69	1.44	1.56
.17	1.21	1.03	1.03	0.89	1.01
.42	1.39	0.76	0.89	0.68	0.92
.08	-0.33	-0.92	-0.23	-1.22	-0.30
.42	1.47	1.81	1.76	1.62	1.66
.17	1.65	1.78	1.74	1.39	1.64
.73	1.41	1.37	1.26	1.54	1.31
.67	1.50	1.68	1.72	1.12	1.53
.80	1.18	1.24	1.24	1.29	1.22
.64	1.06	1.47	1.11	1.06	1.11
.10	0.56	1.02	1.00	0.83	0.80
.33	0.73	0.70	-0.40	0.44	0.43
.25	0.20	0.49	-0.41	0.73	0.40
.17	0.00	0.59	-0.49	0.55	0.39
1.17	1.35	0.29	0.53	0.97	0.42
1.00	1.29	0.96	0.98	0.65	0.94
1.25	0.95	1.35	1.37	1.18	1.30
1.27	0.80	1.11	1.15	0.97	1.04
1.33	1.35	1.12	1.08	0.73	1.06
-0.36	0.55	0.75	0.68	0.65	0.64
0.25	0.15	0.52	0.56	0.11	0.53
0.82	1.22	0.96	0.91	0.66	0.95
-0.67	0.42	1.03	1.05	0.36	1.01
1.00	1.05	0.65	1.04	0.53	0.82
1.09	1.41	1.13	0.97	0.70	1.05
1.00	1.38	0.98	0.99	1.04	1.05
-0.42	0.47	0.29	0.41	-0.05	0.40
1.00	1.11	0.37	0.64	0.90	0.50
0.70	1.41	0.95	0.84	0.58	0.90
1.50	1.65	1.11	1.03	0.94	1.14
-0.08	0.55	0.29	0.34	0.33	0.32
0.69	0.92	0.86	0.80	0.71	0.82

FIGURE 2

GRAPHIC PRESENTATION OF INDIVIDUAL ACCEPTABILITIES

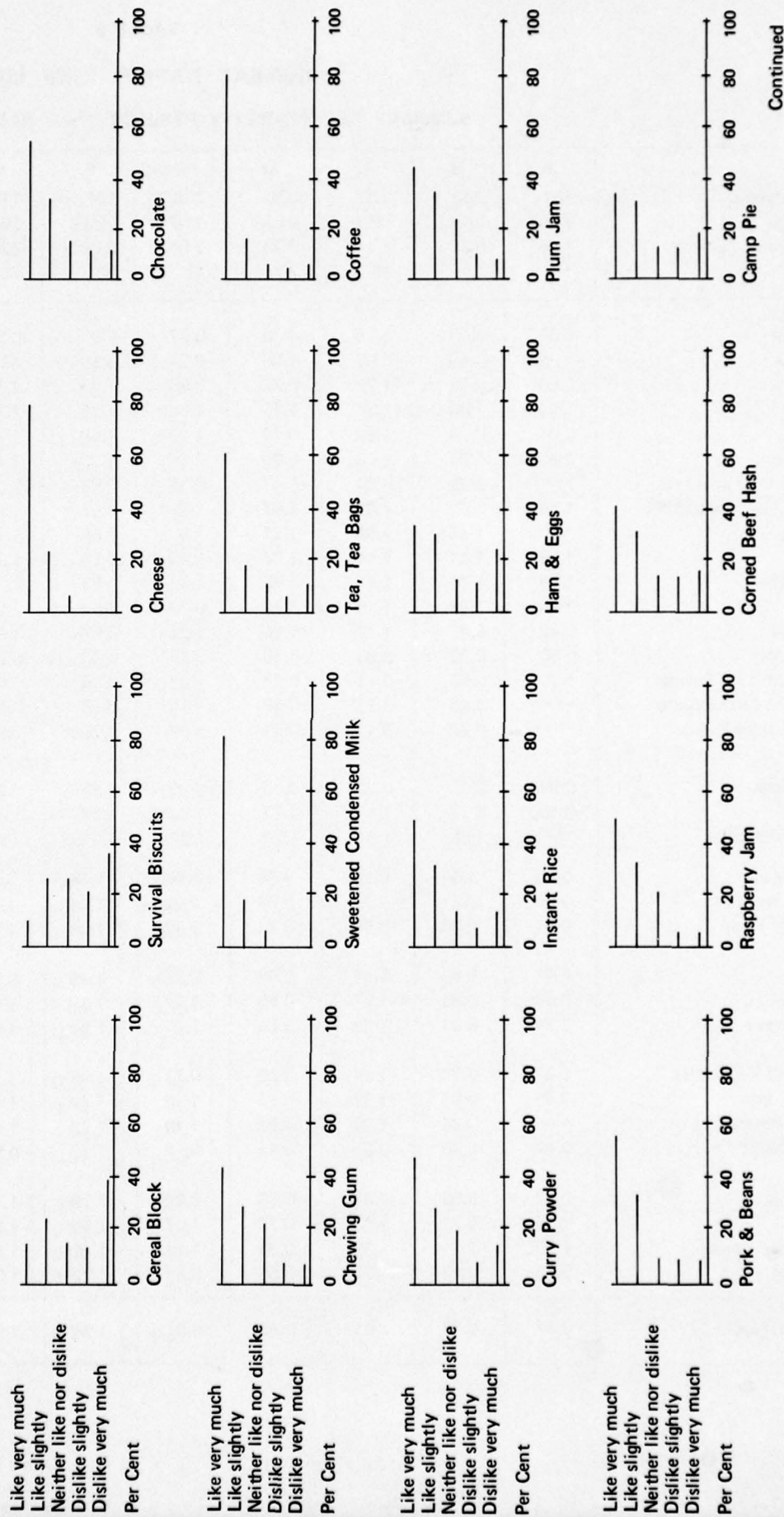
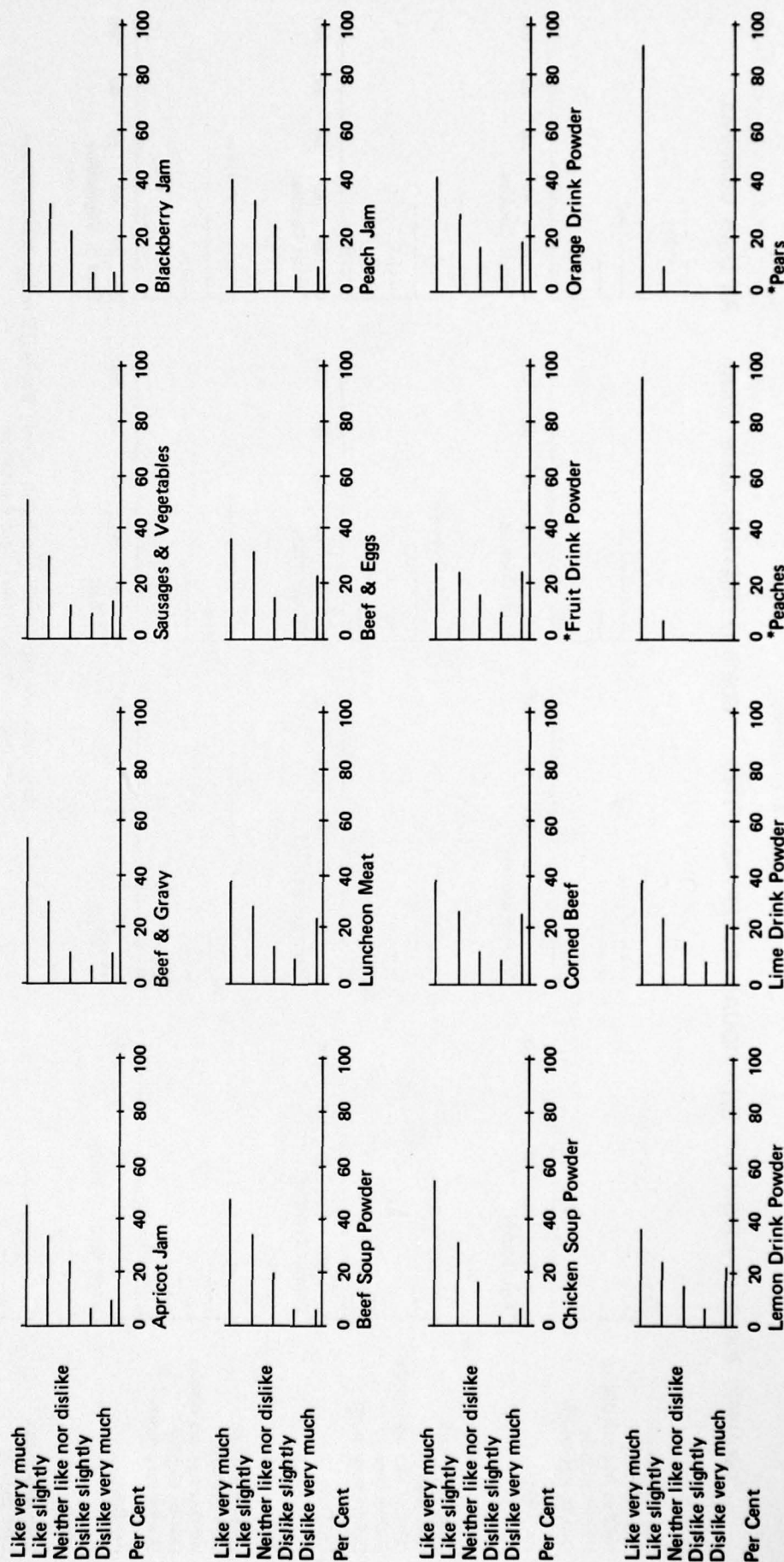


FIGURE 2 (Continued)

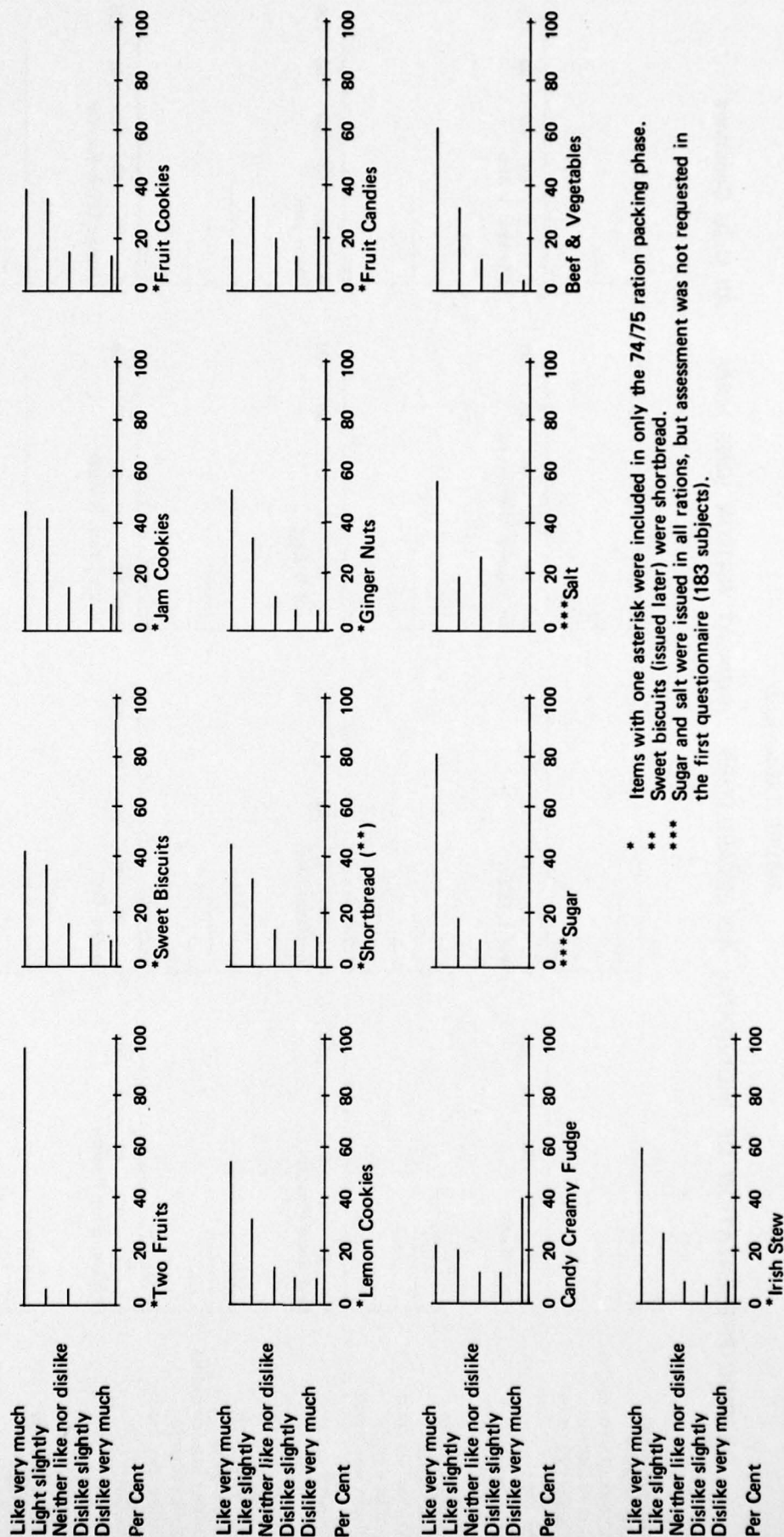
GRAPHIC PRESENTATION OF INDIVIDUAL ACCEPTABILITIES COMBAT RATION (ONE MAN) ALL Units Combined



Continued

FIGURE 2 (Continued)

GRAPHIC PRESENTATION OF INDIVIDUAL ACCEPTABILITIES COMBAT RATION (ONE MAN) ALL Units Combined



* Items with one asterisk were included in only the 74/75 ration packing phase.
 ** Sweet biscuits (issued later) were shortbread.
 *** Sugar and salt were issued in all rations, but assessment was not requested in the first questionnaire (183 subjects).

Exercise

Annex A
as used in
Ex "Swamp Fox"

*Armed Forces Food Science Establishment
Scottsdale, Tasmania*

PATROL RATION (ONE MAN)
USER QUESTIONNAIRE

1. As a consumer of the rations you are in the best position to advise us on any changes that should be made.
2. Please complete this questionnaire by recording your *honest* reactions.
3. All answers will be treated as confidential.

Name and Rank

Unit..... Squadron
Company..... Regiment..... Corps..... ARA
Battery ARes

(Delete words not applicable)

Age..... Married ☐ Single ☐

Years of Service

ITEMS COMMON TO MORE THAN ONE VARIETY

[illegible]

Please tick whichever boxes you think describe the particular food item best.

Menu A

Beef & Onions

☐

Savoury Steak
Fingers

☐

Like Very Much

Like Slightly

Neither Like Nor Dislike

Dislike Slightly

Dislike Very Much

Never Tried It

Not Enough

About Right

Too Much

Discarded It

☐
☐
☐
☐
☐
☐
☐
☐
☐
☐
☐
☐
☐
☐
☐
☐

The Packaging is:

Satisfactory

Too Shiny

Too Crackly

Too Flimsy

☐
☐
☐
☐
☐
☐
☐
☐

Menu B

Beef &
Beans

☐

Roast Sliced
Pork

☐

Like Very Much

Like Slightly

Neither Like Nor Dislike

Dislike Slightly

Dislike Very Much

Never Tried It

Not Enough

About Right

Too Much

Discarded It

☐
☐
☐
☐
☐
☐
☐
☐
☐
☐
☐
☐
☐
☐
☐
☐

Menu C

Sweet & Sour
Pork

☐

Lamb &
Veg. Curry

☐

Like Very Much

Like Slightly

Neither Like Nor Dislike

Dislike Slightly

Dislike Very Much

Never Tried It

Not Enough

About Right

Too Much

Discarded It

☐
☐
☐
☐
☐
☐
☐
☐
☐
☐
☐
☐
☐
☐
☐
☐

[illegible]

Thank you for your help. When the results are gathered and analysed, your thoughts could be important in improving the ration packs.

Exercise

Annex B
as used in Exs
"Big Country"
"Maiden Magpie"
"Quadrant Quail"
"Apple Pioneer"
"Best Day"
"Swamp Fox"

*Armed Forces Food Science Establishment
Scottsdale, Tasmania*

COMBAT RATION (ONE MAN)
USER QUESTIONNAIRE

1. As a consumer of the rations you are in the best position to advise us on any changes that should be made.
2. Please complete this questionnaire by recording your *honest* reactions.
3. All answers will be treated as confidential.

Name and Rank

Unit..... Squadron
Company..... Regiment..... Corps..... ARA
Battery..... ARes

(Delete words not applicable)

Age

Married ☐

Single ☐

Years of Service

ITEMS COMMON TO MORE THAN ONE VARIETY

[illegible]

[illegible]

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There is a small, dark, irregular mark near the top left corner, possibly a smudge or a piece of tape. The rest of the page is blank.

Thank you for your help. When the results are gathered and analysed, your thoughts could be important in improving the ration packs.

AUSTRALIAN ARMY

PATROL RATION (ONE MAN)**Contents and Instruction Sheet**

This ration pack is available in three menus: A, B and C. The contents of each menu differ to the extent shown in the following list, and you should try to have a different menu each day.

MENU A

Beef and Onions
Savoury Steak Fingers
Fruit Juice Powder — Orange
Biscuits, Raspberry Crunch
and Shortbread

MENU B

Beef and Beans
Roast Sliced Pork
Fruit Juice Powder — Lemon
Biscuits, Shortbread and
Raspberry Crunch

MENU C

Lamb and Vegetable Curry
Sweet and Sour Pork
Fruit Juice Powder — Lime
Biscuits, Shortbread and
Raspberry Crunch

The following items are common to all three menus:

Processed Cheese Sticks
Instant Milk
Candy Creamy Fudge
Rice
Sugar

Instant Coffee
Tea Bags
Salt
Chewing Gum
Matches

Plastic Spoon
Water Measure
Spare Pouch
Toilet Paper
Rubber Band

AUSTRALIAN ARMY

COMBAT RATION (ONE MAN)

CONTENTS AND INSTRUCTION SHEET

This Ration Pack is available in five menus — A, B, C, D and E. The contents of each menu differing to the extent shown in the following lists. You should endeavour to have a different menu each day.

A	B	C	D	E
Ham & Egg 1 x 4 oz Jam, Plum 1 x 1 oz Curry Powder 1 x 1/8 oz Beef & Veggies 1 x 8 oz Instant Rice 1 x 2 oz	Pork & Beans 1 x 4 oz Jam, Raspberry 1 x 1 oz Curry Powder 1 x 1/8 oz Corned Beef Hash 1 x 8 oz Instant Rice 1 x 2 oz	Luncheon Meat (Camp Pie) 1 x 4 oz Jam Apricot 1 x 1 oz Curry Powder 1 x 1/8 oz Beef with Gravy 1 x 8 oz Instant Rice 1 x 2 oz	Sausages & Veggies 1 x 4 oz Jam, Blackberry 1 x 1 oz Soup Pdr, Beef 1 x 1/2 oz Luncheon Meat 1 x 8 oz	Beef & Egg 1 x 4 oz Jam, Peach 1 x 1 oz Soup Pdr, Chicken 1 x 1/2 oz Corned Beef 1 x 8 oz

The following items are common to all menus:

Cereal Block	1 x 2 oz	Sweetened Condensed Milk	1 x 2 1/2 oz	Matches	1 x book
Biscuits Survival	2 x 1 1/2 oz	Sugar	12 x 7 gms	Can Opener	1 x Nos
Biscuits Sweet	1 x 3 oz	Tea Bags	2 x Nos	Rubber Band	1 x Nos
Cheese	1 x 1 oz	Instant Coffee	2 x 1/8 oz	Toilet Paper	1 x 5 sheets
Chocolate	1 x 2 oz	Salt	1 x 1/4 oz	Scouring Pad	1 x Nos
Chewing Gum	1 x 5 sticks	Fruit Drink Powder	1 x 1/2 oz		
Candy Creamy Fudge	1 x 3 oz				

DISTRIBUTION LIST

	No. of Copies		No. of Copies
DEFENCE ESTABLISHMENTS		DEFENCE ESTABLISHMENTS Cont'd.	
Department of Defence, Russell Offices, CANBERRA, A.C.T. 2600		Headquarters Operational Command, (Staff Officer Catering), RAAF, PENRITH, N.S.W. 2750	1
(a) Secretary	1	Headquarters, Support Command (CE04/E41), RAAF, Defence Centre, 366 St. Kilda Road, MELBOURNE, Vic. 3000	
(b) Chief Defence Scientist	1	Catering Supervisor, Log Branch, HQ 1 MD, Victoria Barracks, BRISBANE, Qld. 4000	1
(c) Executive Controller, Australian Defence Scientific Service	1	Headquarters, 2 Military District, Victoria Barracks, SYDNEY, N.S.W. 2000	2
(d) Controller, Service Laboratories and Trials Division	2	Headquarters, 3 Military District, Victoria Barracks, MELBOURNE, Vic. 3000	1
(e) Superintendent, Defence Science Administration Division	1	Headquarters, 4 Military District, Kewick Barracks, ADELAIDE, S.A. 5035	1
(f) JIO (DDSTI)		51 Sup Bn, Irwin Barracks, KARRAKATTA, W.A. 6010	1
Department of Defence (Army Office), Russell Offices, CANBERRA, A.C.T. 2600		Headquarters, 6 Military District, Anglesea Barracks, HOBART, Tas. 7002	1
(a) Directorate of Army Development	1	Headquarters, 7 Military District, Larrakeyah Barracks, DARWIN, N.T. 5790	1
(b) Director of Infantry	2	Royal Military College, DUNTROON, A.C.T. 2600	
(c) Director of Catering	1	(a) The Librarian, Bridges Memorial Library	1
(d) Directorate of Army Development, C/- Scientific Adviser - Army	1	(b) The Faculty Admin Officer, Faculty of Military Studies	1
Department of Defence (Air Force Office) Russell Offices, CANBERRA, A.C.T. 2600		Commandant, Australian Staff College, FORT QUEENSCLIFFE, Vic. 3255	2
(a) Air Force Scientific Adviser	1	Commanding Officer/Chief Instructor, RAAOC Centre, Milpo, BANDIANA, Vic. 3662	2
(b) Director of Catering and Services (DCATSERV-AF)	2	Commandant, RAAF Staff College, RAAF Base, Fairbairn, CANBERRA, A.C.T. 2600	2
Department of Defence, Campbell Park Offices, CANBERRA, A.C.T. 2601		Director, Institute of Aviation Medicine, POINT COOK, RAAF, Vic. 3029	2
(a) Defence Information Services Branch	10		
(b) Defence Central Library	1		
Senior Librarian, Aeronautical Research Laboratories, P.O. Box 4331, MELBOURNE, Vic. 3001	1		
Senior Librarian, Defence Research Centre, G.P.O. Box 2151, ADELAIDE, S.A. 5001	1		
Joint Tropical Trials and Research Establishment, P.O. Box 931, INNISFAIL, Qld. 4860	1		
Directorate of Supply (Technical Services), Department of Defence (Army Office), G.P.O. Box 1932R, MELBOURNE, Vic. 3001	2		
Supply Division, HQ Logistic Command, St. James Plaza, G.P.O. Box 1932R, MELBOURNE, Vic. 3001	1		
Directorate of Army Health Services, G.P.O. Box 1932R, MELBOURNE, Vic. 3001	2		
The Director of Naval Victualling, Department of Defence (Navy Office), Victoria Barracks, St. Kilda Road, MELBOURNE, Vic. 3004	2		
Headquarters, Field Force Command, Victoria Barracks, PADDINGTON, N.S.W. 2021	3		
Headquarters, Logistic Command, St. James Plaza, G.P.O. Box 1932R, MELBOURNE, Vic. 3001	3		
Headquarters, Training Command, Victoria Barracks, PADDINGTON, N.S.W. 2021	1		
		CIVILIAN ESTABLISHMENTS	
		The Librarian, CSIRO, Tasmanian Regional Laboratory, Stowell Avenue, HOBART, Tas. 7000	1
		The Librarian, CSIRO Division of Food Research, P.O. Box 52, NORTH RYDE, N.S.W. 2113	1
		The Librarian, CSIRO Dairy Research Laboratory, P.O. Box 20, HIGHETT, Vic. 3190	1

CIVILIAN ESTABLISHMENTS Cont'd.

	No. of Copies
Aust. Government Analyst, Department of Science, P.O. Box 449, WODEN, A.C.T. 2606	1
Dr. R. I. Garrod, Department of Science, 568 St. Kilda Road, MELBOURNE, Vic. 3004	1
The Central Library, Department of Health, P.O. Box 100, WODEN, A.C.T. 2606	2
Dr. R. C. Hutchinson, Derwentlaken Road, OTAGO, Tas. 7402	1
Tasmanian Collection, State Library of Tasmania, 91 Murray Street, HOBART, Tas. 7000	1
Serials Section, State Library of Tasmania, 91 Murray Street, HOBART, Tas. 7000	1
Reference Section, Hellyer Regional Library, Alexander Street, BURNIE, Tas. 7320	1
Director, Food Preservation Laboratory, Department of Primary Industries, HAMILTON, Qld. 4000	1
Head, Food School, East Sydney Technical College, Forbes Street, DARLINGHURST, N.S.W. 2010	1
Professor R. A. Edwards, Head, School of Food Technology, University of New South Wales, KENSINGTON, N.S.W. 2033	1
Preliminary Processing, National Library of Australia, CANBERRA, A.C.T. 2600	2
Serials, Biomedical Library, University of New South Wales, KENSINGTON, N.S.W. 2033	1
The Medical Library, Flinders University of South Australia, BEDFORD PARK, S.A. 5042	1

OVERSEAS ESTABLISHMENTS

BRITAIN

Australian Army Representative, Australia House, Strand, London, WC2 B4LA, England	1
Director of Supplies of Transport (FMV), Section 82B, Room 1235, Ministry of Defence, Empress State Building, London, SW6 1TR, England	1
Adviser in Nutrition, AMD5, (Army Dept), Ministry of Defence, Landsdowne House, Berkeley Square, London, W1, England	1
Deputy Chief Scientist (Army), SAG (A) 3b, Ministry of Defence, Main Building, Whitehall, London SW 1A 2HB, England	1
The Director, Army Personnel Research Establishment, C/- Royal Aircraft Establishment, Farnborough, Hants, England	1
The Information Officer, British Food Manufacturing Industries Research Association, Randalls Road, Leatherhead, Surrey, KT227RY, England	1

OVERSEAS ESTABLISHMENTS Cont'd.

BRITAIN Cont'd.

	No. of Copies
The Librarian, Food Research Institute, Colney Lane, Norwich, Norfolk NR4 7UA, England	1
Superintendent, Foods and Nutrition Division, Laboratory of the Government Chemist, Cornwall House, Stamford Street, London SE1 9NQ, England	6
The Librarian, A.R.C. Meat Research Institute, Langford, Bristol, BS18 7DY, England	1
Dr. D. J. McWeeny, Ministry of Agriculture, Fisheries and Food, Food Laboratory, Haldin House, Queen Street, Norwich, Norfolk, NR2, 4SK, England.	1
Mr. R. E. Goodman, Food Science Division, Ministry of Agriculture, Fisheries and Food, Great Westminster House, Horseferry Road, London, SW1P 2AE, England	1
The Librarian, National College of Food Technology, University of Reading, St. George Avenue, Weybridge, Surrey, England	1
The Director, Tropical Products Institute, Gray's Inn Road, London WC1X 8LU, England	1

CANADA

National Defence Headquarters, Ottawa, Ontario, K1A 0K2	
(a) Major Jean Wallace (DCGE 3-4)	2
(b) D Food S	1
(c) DGOS Technical Library	1

SRI LANKA

Director, Food Research and Nutrition Council, C/- Food Commissioner, Union Place, Colombo, Sri Lanka	1
--	---

FEDERAL REPUBLIC OF GERMANY

Armed Services Food Chemist, 89 Supply Depot, RAO (BFPO 40) Viersen, Federal Republic of Germany	1
---	---

GHANA

Defence Adviser, Ghana High Commission, 13 Belgrave Square, London, SW1X 8PR, England	5
--	---

INDIA

Director General, Research and Development Organisation, Ministry of Defence, New Delhi, 11	2
The Director, Defence Food Research Laboratory, Jyothi Nagar, Mysore 570 010, India	2

MALAYSIA

Director, Defence Research Centre, Ministry of Defence, Rifle Range Road, Kuala Lumpur, Malaysia	3
---	---

OVERSEAS ESTABLISHMENTS Cont'd.**NEW ZEALAND**

Chief Scientist,
Defence Science Organisation, DSIR,
P.O. Box 8010,
Wellington, New Zealand

No. of
Copies

1

Assistant Chief Defence Staff (Support
Services)

Ministry of Defence,
Private Bag,
Wellington, New Zealand

2

DADST(S)
Home Command,
Ministry of Defence,
Private Mail Bag,
Wellington, New Zealand

1

PAPUA NEW GUINEA

Headquarters,
Australian Defence Cooperation Group,
(HQ ADCG),
P.O. Box 2270,
Konedobu, Port Moresby

3

PHILIPPINES

Science Research Supervisor,
Food Research Division,
Food and Nutrition Research Institute,
Manila, Philippines

No. of
Copies

1

UNITED STATES OF AMERICA

Chief, Food and Nutrition Section,
NASA — Manned Spacecraft Center,
Houston, Texas

Director,
U.S. Army Natick Laboratories
(Food Laboratory)

Natick, Massachusetts, U.S.A.

2

Director,
U.S. Army Medical Research and
Nutrition Laboratory,
Fitzsimons General Hospital,
Denver, Colorado, U.S.A. 80240

2