



MINISTRY OF FOOD

**The Urban
Working-Class Household
Diet
1940 to 1949**

FIRST REPORT OF
THE NATIONAL FOOD SURVEY
COMMITTEE

LONDON
HIS MAJESTY'S STATIONERY OFFICE

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THE NATIONAL FOOD SURVEY COMMITTEE

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PREFACE

THE NATIONAL FOOD SURVEY was initiated by the Ministry of Food in 1940. Its purpose was to provide an independent check on the food consumption and expenditure of the population during the war and thus to assess the effectiveness of the Government's war-time food policy. Owing to the continuing food supply difficulties in the post-war period, and because the information provided by the Survey was found to be of special value in relation to derationing and other aspects of post-war food policy, the Survey was continued in its war-time form until the end of 1949.

It was assumed that the effectiveness of the war-time food policy would be most clearly reflected in the food consumption and expenditure of urban working-class households. The Survey was therefore mainly directed towards such households, though special studies were made from time to time of other groups of the population. As a result there is available an almost unbroken record since 1940 of the food purchases and, since 1942, of the food consumption of a widely distributed sample of urban working-class households.

During the war it was not possible to analyse in detail the great mass of information which had been collected, nor to set the results of such an analysis against the constantly changing background. However, the potential importance of the information, and the desirability of making it more generally available, led to the appointment in 1948 of a National Food Survey Committee which was invited to consider the available material and make recommendations regarding its publication.

After reviewing the data, the Committee decided to recommend the issue of a series of reports, each of which would be concerned with one or more special aspects of the material. The present report, the first of the series, presents material for the years 1940-1949 in the form of annual averages, and so furnishes a broad picture of the yearly changes in food consumption of urban working-class households. Further reports at present in preparation will cover changes in food expenditure, and such special aspects as food consumption by different social classes and in different geographical areas. While the resulting series of reports will be largely technical in character, it is hoped to publish at a later date a more popular account of the main conclusions.

The treatment of the material in the present report is set out in the List of Contents. In the opening section, a short account is given of the pre-war diet as recorded in a number of contemporary budgetary surveys. In subsequent sections, the changes in the war-time diet are set against the background of changes in the total food supplies moving into civilian consumption (based largely on the estimates already published in *Food Consumption Levels in the United Kingdom*, Cmd. 7842) and of the development of food policy during the war years. Thereafter, similar comparisons are made in relation to the post-war food supplies. Both for the war and post-war years, full discussions are included of the trends in consumption of individual foods, and of the contribution of each food to the energy value and nutrient composition of the diet. Finally, in Appendix A the methods and reliability of the Survey are dealt with while in Appendix B the annual average figures for food consumption and food purchases are set out in a single series from 1940

to 1949. Considerations of space prohibit the publication of quarterly averages, but if reference to these is desired they can be consulted in the Ministry's Library.

Discussion of the adequacy of the war and post-war diets has inevitably involved comparisons with the pre-war levels of food consumption. As noted in the text of the report, the data available for the pre-war years are sparse and the coverage is by no means identical with that of the present Survey. Moreover, although the pre-war levels of food consumption of most sections of the population were satisfactory, there were some whose diet was not fully adequate. For this reason it would clearly be a mistake to lay too much stress on such comparisons.

The preparation of the present report has been undertaken jointly by Mr. W. L. Kendall, who has been responsible for the general design and for the sections on food consumption data, and Miss D. F. Hollingsworth, who has prepared the sections on energy value and nutrient composition. The Committee desire to express their indebtedness to these two officers of the Ministry for the most competent manner in which they have implemented the Committee's recommendations. Throughout the preparation of the report, and particularly in those sections covering the war years, the Committee has received valuable suggestions and assistance from Professor E. F. Nash, who was largely responsible, when an officer of the Ministry, for developing the Survey in its early years. In the course of the drafting of the report, the Committee has also been fortunate in securing much valued guidance from Dr. Isabella Leitch. As will be clear from the text of the report itself, the National Food Survey owes much to the London Press Exchange. Their skill in building up a staff of investigators at a time when enemy attacks and social dislocation involved grave hazards and difficulties in the prosecution of the field work represented a remarkable achievement in survey organisation. The excellent work of the Ministry of Food's Surveys and Hollerith Sections has also contributed largely to the success of the Survey.

Finally, the Ministry and the Committee are alike indebted to the many housewives who, at whatever cost of time and trouble, co-operated in providing the wealth of information on which the Survey is based. This information has already been extensively used in the daily work of the government. It is hoped that the publication of the present series of reports will now demonstrate in tangible form the valuable results which can accrue from such willing co-operation on the part of the public.

NORMAN C. WRIGHT

Chairman

National Food Survey Committee

22nd May, 1951

LIST OF CONTENTS

	<i>Paragraphs</i>
I. INTRODUCTION	1-7
II. DIETARY TRENDS BEFORE THE WAR	8-14
III. THE NATIONAL DIET DURING THE WAR	15-156
FOOD DEFENCE PLANS	15-18
THE INTRODUCTION OF FOOD CONTROL	19-30
THE URBAN WORKING-CLASS DIET 1940 TO 1941	31-43
THE WAR-TIME DIET AFTER 1941	44-50
THE NATIONAL FOOD SURVEY 1942 TO 1945	51-53
THE URBAN WORKING-CLASS DIET 1942 TO 1945	54-56
CONSUMPTION OF INDIVIDUAL FOODS 1942 TO 1945	57-113
<i>Milk</i>	58-62
<i>Cheese</i>	62-65
<i>Meat</i>	66-74
<i>Fish</i>	75-78
<i>Eggs</i>	79-81
<i>Fats</i>	82-85
<i>Fruit</i>	87-89
<i>Vegetables</i>	91-96
<i>Garden and Allotment Produce</i>	97-101
<i>Cereal Foods</i>	102-109
<i>Sugar and Preserves</i>	110-113
ENERGY VALUE AND NUTRIENT COMPOSITION OF THE DIET	
1942 TO 1945	114-156
<i>Energy value</i>	118-123
<i>Protein</i>	124-127
<i>Fat</i>	128-130
<i>Calcium</i>	131-133
<i>Iron</i>	134-135
<i>Vitamins</i>	136-156
<i>Vitamin A</i>	138-141
<i>Vitamin B₁</i>	142-144
<i>Riboflavin</i>	145-147
<i>Nicotinic Acid</i>	148-150
<i>Vitamin C</i>	151-154
<i>Vitamin D</i>	155-156

IV. THE NATIONAL DIET AFTER THE WAR ...	...	157-226
THE POST-WAR FOOD PROBLEM ... ..	...	157-168
THE NATIONAL FOOD SURVEY 1945 TO 1949 ... ..	...	169-173
THE URBAN WORKING-CLASS DIET 1945 TO 1949 ... ..	...	174-178
CONSUMPTION OF INDIVIDUAL FOODS 1945 TO 1949 ... ..	...	179-211
<i>Milk</i> ... ..	...	180-184
<i>Cheese</i> ... ..	...	185
<i>Meat</i> ... ..	...	186-191
<i>Fish</i> ... ..	...	192-193
<i>Eggs</i> ... ..	...	194
<i>Fats</i> ... ..	...	195-199
<i>Fruit and Vegetables</i> ... ..	...	200-206
<i>Cereal Foods</i> ... ..	...	207-209
<i>Sugar and Preserves</i> ... ..	...	210-211

ENERGY VALUE AND NUTRIENT COMPOSITION OF THE DIET

1945 TO 1949 ... ..	...	212-226
<i>Energy value</i> ... ..	...	213-214
<i>Protein</i> ... ..	...	215
<i>Fat</i> ... ..	...	216
<i>Calcium</i> ... ..	...	217-218
<i>Iron</i> ... ..	...	219
<i>Vitamin A</i> ... ..	...	220
<i>Vitamin B₁</i> ... ..	...	221
<i>Riboflavin</i> ... ..	...	222
<i>Nicotinic Acid</i> ... ..	...	223
<i>Vitamin C</i> ... ..	...	224
<i>Vitamin D</i> ... ..	...	225-226

APPENDIX A.

Methods and Reliability of the National Food Survey

APPENDIX B.

Table 1. Domestic Food Consumption by Urban Working-Class 1942 to 1949

Table 2. Domestic Food Purchases by Urban Working-Class 1940 to 1949

I. INTRODUCTION

1. The National Food Survey, or Wartime Food Survey as it was called during the greater part of the war, is an inquiry into household food expenditure, purchases and consumption made by the Ministry of Food using records supplied voluntarily by selected samples of housewives. When it was started in July 1940 records were collected at roughly quarterly intervals, but in February 1942 the technique was revised and the survey made continuous. Since that date and up to 1950 the methods used have remained substantially unchanged.

2. The Survey was at first confined to working-class households selected at random within chosen districts of a number of towns in different parts of Great Britain but, in later years, other households were included and studies also made from time to time of households, such as those of heavy workers, or those dependent on pensions, or households in "slum" areas, whose food consumption required particular attention. The present report is concerned with the average results obtained from the general samples of urban working-class households. It is a narrative of the general changes in working-class food consumption, from 1940 to 1949, set against the background of the food situation and food policy during the war and post-war years.

3. In considering these results, it is necessary to bear in mind that the primary purpose of the Survey was to assist the Government when considering the measures necessary to mitigate the effects of wartime food shortages; it was not devised at the time to provide a continuous record of food consumption. The limitations of the methods used in the Survey must also be noted. These are fully explained in Appendix A, but their principal features may be summarised here. The information was obtained from housewives who, with the co-operation of the investigator, completed a log-book covering seven full days.

The records obtained by these means included:—

- (a) The quantities and value of all foods purchased during the week of the Survey, and the quantities and estimated value of food obtained from gardens and allotments, and as gifts or perquisites;
- (b) a list of the meals eaten away from home (other than packed meals prepared at home) by members of the household and of the meals served to visitors, of the dishes served at each meal taken in the household and of the persons taking it;
- (c) particulars of the sex, age and occupations of the members of the household.

After February 1942, the investigator, in addition, recorded the quantities of household stocks of food at the beginning and end of the Survey week. Questions about income were not included. The attempt to obtain information on income from a proportion of the 1943 sample met with a disappointing response and involved difficulties which led to its abandonment after the close of that year.

4. In general, the Survey is believed to have reached a high degree of accuracy as a record of the quantities it sought to measure and in relation to the households included in the samples. It was not a record of *total* food consumption, for a survey of this kind cannot attempt to measure the food consumed in meals

and snacks purchased away from home,¹ and purchases of sweets and chocolates, ice-cream, and alcoholic and most soft drinks, whose amount may not be accurately known to the housewife, were not recorded. After February 1942, it was possible when estimating consumption to allow for larger stocks changes during the weeks of the Survey, but no measurement was attempted of the wastage of food in the household, although the conversion factors used to estimate consumption in terms of nutrients make allowance for the inedible portions normally contained in the foods as purchased.

5. Difficulties of a different character arise from the nature of the samples. It is almost impossible, in a survey relying on personal visits by investigators, to avoid a bias in favour of households with young children or elderly persons, with which contact is relatively easy to establish, and a corresponding under-representation of those consisting solely of adults of working age, especially those whose members are all employed outside the home. Further, even if a truly representative sample could be obtained in the areas chosen for the survey, considerations of cost have made it necessary to limit the number of these areas. The estimates of food consumption obtained from the sample may as a result include errors due to the bias in household composition and to regional differences in consumption habits or family composition.

6. For the purposes of a continuous record the comparability of the Survey samples for different periods is important. During the ten year period covered by this report the development of survey technique, the extension of its scope, and wartime difficulties such as the incidence of air raids and the shortage of investigators, made modifications in the methods of the survey inevitable. These changes may have impaired the validity of the results as a record of year to year changes in average consumption, and these are noted in the report. One of the principal limitations of the Survey is the absence of continuous information about the incomes of the families surveyed, so that fluctuations which may have occurred in the social class from which the families were drawn at different times are difficult to detect.²

7. The regional distribution and average composition of the families taking part in the Survey year by year are shown in Tables 1 and 2. Except in a few instances, to which attention is drawn in the Report, the changes in the geographical composition of the sample are unlikely to have affected the comparability of the figures to any great extent. The fall in the average number of adults per household from 1941 to 1945 and the increase in the later years are the results of calling-up and of subsequent demobilisation. Over the whole period of the war, but more particularly in the earlier years, the number of children per household in the Survey samples was probably below the average for the urban working-class as a whole, since evacuation moved children from the larger towns to those smaller towns and country districts where there was less chance of their being included. The average number of children under 14 in industrial working-class families surveyed by the Ministry of Labour in 1937 and 1938 was 0.99, but in the National Food Survey sample for 1941, the average was only 0.80. Since the war ended the evacuation movement has been reversed and there has been a continuous rise in the number of children in the surveyed households. These considerations probably explain most of the fluctuations in the number of children in the survey samples,³ except that since 1946 the rising birth-rate has to be taken into account.

¹ It is estimated that meals away from home may have accounted for about 10 per cent of the energy value of the diet. (See Appendix A, paragraphs 27 to 29).

² An instance of possible change in class structure of the sample is noted in paragraph 53 below.

³ The decline between 1943 and 1944 is considered in paragraph 53 below.

TABLE 1
Distribution of Urban Working-class Households by regions in the Family Food Survey Sample 1941-1949

	Scot-land	North-Eastern	North-Western	Mid-lands	London and South-Eastern	South-Western	Total Households	
	%	%	%	%	%	%	%	
1941	10.9	18.0	9.5	17.1	25.9	18.6	100	4,795
1942	10.9	13.0	10.9	21.3	28.4	15.5	100	8,567
1943	9.9	13.1	11.5	21.3	30.2	14.0	100	9,141
1944	10.8	11.7	11.7	23.6	31.3	10.9	100	7,623
1945	12.7	15.5	13.9	19.2	27.5	11.2	100	7,225
1946	13.9	14.6	17.5	14.5	29.5	10.0	100	8,204
1947 (a)	12.5	17.2	17.7	16.7	26.2	9.7	100	5,942
1948 (b)	13.4	15.7	12.1	18.2	30.4	10.2	100	5,623
1949	10.0	16.8	13.5	16.0	32.6	11.1	100	7,119

(a) January to September only.
 (b) excluding February and March.

TABLE 2
Sample of Urban Working-class Households used in the Family Food Survey 1941-1949

Number and composition of households

	(a) House- holds	(d) Persons	Average per household of			
			Adults	Adole- scents	Children under 14	All persons
1941	4,795	16,615	(2.30)	(0.36)	0.80	3.46
1942	8,567	29,493	2.20	0.37	0.87	3.44
1943	9,141	31,733	2.18	0.36	0.93	3.47
1944	7,623	26,015	2.23	0.31	0.86	3.41
1945	7,225	24,968	2.18	0.33	0.94	3.45
1946	8,204	29,260	2.29	0.34	0.94	3.57
1947	5,942 (b)	21,334	2.32	0.31	0.96	3.59
1948	5,623 (c)	20,178	2.30	0.31	0.98	3.59
1949	7,119	25,737	2.26	0.30	1.06	3.62
(Unweighted) Average 7,138		25,037	2.25	0.33	0.93	3.51

(a) " Household " includes all persons for whom the housewife caters.
 (b) Nine months only.
 (c) Ten months only.
 (d) " Person " prior to 1943 meant one who had been in the household for four or more days in the week. Since 1943, it meant one having at least 16 meals in the house during the week.

II. DIETARY TRENDS BEFORE THE WAR

8. In 1935 an Advisory Committee on Nutrition was appointed by the Minister of Health and the Secretary of State for Scotland to inquire into the diet of the people "and to report as to any changes therein which appear desirable in the light of modern advances in the knowledge of nutrition".¹ The Committee drew upon the preliminary results of a study then being made by the Market Supply Committee² of the demand for various foods and compiled a table comparing the results with the earlier estimates of Sir Alfred Flux.³ This table forms the basis of Table 3.

TABLE 3
Consumption of Certain Foods in the United Kingdom 1909-1938
From the First Report of the Advisory Committee on Nutrition)

	<i>per head per week</i>				Increase (+) or decrease (-) 1934-1935 compared with	
	1909-1913	1924-1928	1934-1935			
				1909-1913	1924-1928	
				%	%	
Meat (including poultry, etc.) ... oz.	41.3	41.0	45.0	+ 9	+ 10	
Cereals (including wheat and flour) oz.	71.2	65.8	64.6	- 9	- 2	
Potatoes ... oz.	74.9	70.9	68.0	- 9	- 4	
Other vegetables ... oz.	22.1	29.0	35.5	+ 61	+ 22	
Milk and cream ... pt.	3.5 (a)	3.4 (a)	3.3	- 6	- 3	
Condensed milk ... pt.	0.8	2.2	3.7	+ 362	+ 68	
Eggs in shell ... no.	1.9	2.3	2.9	+ 53	+ 26	
Butter ... oz.	4.8	5.0	7.8	+ 63	+ 56	
Margarine ... oz.	1.8	3.7	2.4	+ 33	- 35	
Cheese ... oz.	2.2	2.9	3.0	+ 36	+ 3	
Lard ... oz.	1.3 (b)	1.8 (b)	2.9	(c)	(c)	
Sugar ... oz.	24.3	25.6	28.6	+ 18	+ 12	
Fish ... oz.	12.6	12.8	13.9	+ 10	+ 9	
Fruit ... oz.	19.0	28.0	35.7	+ 88	+ 28	
Tea ... oz.	1.9	2.7	2.9	+ 53	+ 7	

(a) These estimates are based upon agricultural returns, and family budget inquiries, giving figures about 10 per cent above those of liquid milk consumption provided by the Milk Marketing Boards.

(b) Lard made in the United Kingdom is included in *meat*.

(c) Not comparable.

9. With the exception of potato and cereal consumption, which appear to have become constant, consumption of all foods was increasing and in particular marked increases are shown during the earlier years for eggs, cheese, fruit and tea. These changes resulted mainly from the general improvement in real

¹ *First Report of the Advisory Committee on Nutrition, 1937.*

² Set up in 1934 by the Agricultural Departments to bring together information on the food position of the country, especially on total requirements in relation to market supply and the effect of changes in price on consumption.

³ "Our Food Supply before and after the War." Flux, A. W. (1930) *J. R. Statist. Soc.* 93, 538.

incomes brought about by rising wage rates and in the inter-war period, by falling world food prices. The Advisory Committee paid special attention to this problem of income and food consumption. They concluded that, as income rises, the consumption of fresh milk, butter, meat, fish, eggs, fruit and vegetables (other than potatoes) also rises; that of flour and potatoes remains nearly constant; and that of margarine and condensed milk falls. Between the highest and the lowest income groups differences in consumption are greatest for milk, fruit and vegetables (other than potatoes), that is, of foods specially important for health, but the immediate effect of increasing the lower incomes is to increase consumption also of sugar, jam, cooking fats and tea as well as cheese, eggs, butter and the foods mentioned above.

10. The question of the adequacy of the pre-war diet raises complex problems of nutrient requirements whose consideration is reserved for a later report. The Advisory Committee, whose views were of particular weight when it became necessary to plan for food supplies during the war, based their conclusions on the scale of requirements suggested by the Technical Commission of the League of Nations Health Organisation. According to this standard, the national diet provided sufficient energy-giving foods for the whole population. All except a relatively small fraction of the population were obtaining their full requirement of calories. There was no deficiency of fat except for the very poor, and no shortage of protein except probably of animal protein in the diets of the poorest.¹ Other nutrients were not discussed by the Advisory Committee but the pre-war diet, as a whole, was probably low in calcium and riboflavin. Total supplies of iron, vitamin B₁, vitamins A and C may have been adequate but their distribution, like that of calcium and riboflavin, was uneven.

11. The Advisory Committee recommended certain measures for improving the national diet. The most far-reaching suggestion, based on the League of Nations' estimate of the individual's calcium requirement, was that the consumption of liquid milk should be doubled to reach a total of seven-eighths of a pint a day.² Two pints a day should be available for nursing mothers, from one to two pints for children and not less than half a pint for the rest of the population. "From the health standpoint there is no other single measure which would do more to improve the health, development and resistance to disease of the rising generation than a largely increased consumption of safe milk, especially by mothers, children and adolescents, and we hope that in dealing with the problem of milk now and in the future, the primary objective of the State will be to ensure that a supply of safe milk, to the amount we have recommended above, is brought within the purchasing power of the poorest."³

12. Other proposals of the Committee included an increase in the supply of eggs sufficient to provide one egg daily for expectant and nursing mothers and children, and of potatoes to replace some of the sugar and highly milled cereals in the diet. These measures would ensure more vitamin C, iron and B vitamins and more readily available calcium and phosphorus. They also proposed that the average weekly consumption of sea fish, which they recognised as a source of iodine, should not be allowed to fall below 8 to 9 oz. per head.

13. On the general question of energy and protein foods, the Committee concluded: "It may be said that where the energy content of the diet needs to be augmented it is preferable to increase the intake of bread rather than that

¹ *First Report of the Advisory Committee on Nutrition*, paragraph 23.

² As compared with the rate of consumption at the time (Table 3) of one-third to one-half of a pint a day.

³ *First Report of the Advisory Committee on Nutrition*, paragraphs 27 and 29.

of sugar, since bread contains some protein, appreciable quantities of important minerals and some vitamin B ; and that where the diet is modified by increasing the protein intake in the form of milk, eggs, fish or meat, any excess of energy hat may result therefrom should be brought down to the standard requirements by reducing the intake of bread and sugar ”.¹

14. While the improvement of this diet depended therefore upon a higher general level of incomes, it did not depend upon that alone. Food consumption habits have their importance and changing a settled habit may at times present the more intractable problem. The extensive change wrought by the war in our food supplies brought both of these problems into prominence.

¹ *Ib.* paragraph 57.

III. THE NATIONAL DIET DURING THE WAR

Food Defence Plans

15. The dislocation of food supplies and distribution that results from modern war compels governments sooner or later to assume wide responsibilities for supplies and prices. The experience of the 1914-1918 war had shown that if such intervention is to be effective steps should be taken before and not after the shortage has occurred and prices have started to rise. Accordingly, the Food (Defence Plans) Department was set up within the Board of Trade in November 1936 to formulate "plans for the supply, control and distribution of food and feedingstuffs for defence purposes".¹

16. Plans were prepared on the assumption that complete control of food supplies might be necessary but that it would rest with the Government at the time to decide the extent of the control required and the date on which the plans should come into operation. The proposals were concerned in the first place with detailed arrangements for a smooth change-over from private trade to Government buying on the outbreak of war, and for the control of both home-produced and imported foods. Secondly, consideration was given to the principles by which the policy of a future Ministry of Food should be guided in time of war.

17. Before the war, the United Kingdom was dependent on imports for more than half of its food supplies: one-half of the meat, nearly all the fats, four-fifths of the sugar and nine-tenths of the cereals and flour. During a war, these imports would compete with munitions for shipping tonnage depleted by losses at sea; the cutting of communications by enemy action might divert trade to sources where our buying power would be limited; or added distance, as with the Southern Dominions, would place an additional burden on shipping. To offset the inevitable reduction in imports, food production at home would need to be expanded, financial measures would be required to counter inflation caused by the shortage of consumer goods of all kinds and price control, rationing and schemes for the control of distribution would need to be devised to secure equitable distribution of food and a nutritionally adequate diet. Plans were accordingly prepared for the rationing of the principal foods, but it was recognised that any profound disturbance of the traditional pattern of the diet could seriously affect public morale. For this reason, and in order to meet the requirements of a population working at an abnormal rate, it would be necessary to keep a careful watch on the national diet. In particular, stress was laid on the importance of a plentiful and preferably an unrationed supply of bread.

18. In considering the nutritional aspects of the national diet the Department was assisted by the work of the Advisory Committee on Nutrition. The Department looked also to the Ministry of Health and the Medical Research Council for guidance on these questions, and one of the results of this collaboration was the scheme, introduced in 1940, for supplying free and cheap milk to expectant mothers and children.²

¹ (1938) Report of the Food (Defence Plans) Department.

² During the war the Government was able to draw upon the expert advice of the War Cabinet's Scientific Committee on Food Policy and of the Inter-departmental Standing Committee on Medical and Nutritional Problems.

The Introduction of Food Control

19. The system of food control as it eventually developed was introduced by stages. During the first stage the Government's principal concern was to give effect to the plans prepared before the war for bringing the chief foods under control. This was accomplished at a much earlier stage and with much less difficulty than during the first world war. As soon as war broke out the Government assumed responsibility for the supply and distribution of staple foods. Stocks in the United Kingdom were requisitioned and by the end of March 1940 the control of imports and shipping was almost complete. The Ministry of Food became sole importer of the chief foodstuffs, buying agencies were set up in exporting countries and bulk-buying contracts were concluded. The Ministry also became sole buyer from the farmer, or directed the sale of farm products through controlled channels, and the machinery for the wartime expansion of home food production through the County War Agricultural Executive Committees was brought into operation by the Ministry of Agriculture.

20. Consumers were asked in November 1939 to register with retailers for butter, bacon and sugar, and rationing was introduced for these commodities in January 1940 and for meat in March 1940. The retail prices of these and of certain other foods were controlled. But the increase in shipping costs and in prices paid to producers both at home and overseas soon involved the Ministry of Food in heavy losses, and the Government was obliged to consider whether in addition to the control of price by orders and regulations it would be necessary to pay subsidies to hold back the rise in the cost of food to consumers. It was decided in January 1940 to subsidise the prices of flour and bread, home-killed meat, bacon and milk. With the assistance of these subsidies the food component of the Ministry of Labour's Cost of Living Index was held in the first six months of 1940 at about 15 per cent above its level at the outbreak of war.

21. The second stage in the development of wartime food control may be said to have begun with the German occupation of Denmark and the Low Countries and the fall of France in the spring of 1940.

22. The reduction in supplies which followed threatened to depress general food consumption to a seriously low level. In this situation, the further extension of rationing and the application of other emergency measures, some of them already planned to come into operation in the event of a severe fall in imports, became inevitable. Margarine was rationed in July 1940, preserves in March 1941, and cheese in May 1941. Early in 1940, margarine had been fortified with vitamins A and D in order to help compensate for the shortage of butter. In April 1941, the extraction rate of flour was raised from 70 to 75 per cent and, in July, some flour was fortified with synthetic Vitamin B₁.¹

23. Measures were also necessary to regulate the provision of meals outside the home. Plans had been made for bringing meat meals, if it became necessary, within the rationing system, and for requiring consumers to surrender coupons for them, but in the policy eventually adopted these meals were accepted as a supplement to the ration and as an economical means of feeding the worker on the job, relieving the overburdened housewife and assisting evacuated families, elderly persons and children.

24. By the end of 1940 all factories working on behalf of the Government and employing more than 250 persons were required to provide meals in canteens. Allocations of food to such canteens took into account the nature of the work carried on in the factories and were larger than for ordinary catering establishments. In this way, some measure of special provision was made for the heavy

¹ See paragraph 46 below.

worker.¹ Eventually, in 1943, the obligation to provide canteens was extended to all factories employing more than 250 persons and most large businesses other than factories also introduced or extended their canteens, some receiving additional allocations of food. Local authorities, too, arranged for communal feeding. "British Restaurants" were first introduced in September 1940 for the provision of meals at a very low cost, and the school meals service undertaken by the Local Education Authorities before the war was rapidly expanded.

25. Among the nutritional measures introduced during 1940 and 1941 the most outstanding was the National Milk Scheme (July 1940) which provided milk free or at a special price for young children and expectant mothers.² Other important measures included the expansion of the Milk-in-Schools Scheme, which had been in existence since 1934, by the joint action of the Ministry of Food and the Education Authorities, and the introduction of the Vitamin Welfare Scheme in December 1941. The latter scheme aimed at supplementing the diet of young children in view of the shortages of fresh fruit, butter and eggs.³ At first cod liver oil and blackcurrant syrup or puree were provided free of charge to children up to two years of age but, later (1942), Lend Lease orange juice replaced the blackcurrant products and the scheme was extended to children up to five years and to expectant mothers. From 1943 expectant mothers could obtain vitamin A and D tablets. Special supplies of eggs, too, were made available to infants, expectant mothers and certain classes of invalids by means of a scheme of controlled distribution introduced during 1941.⁴ In sum, these measures went beyond the replacement of losses in the diet occasioned by the war. They amounted to a positive policy for increasing the provision of those nutrients in which the pre-war diet of the majority who benefited from them had been deficient.

26. Meanwhile the drive to secure the expansion of home-produced food was intensified. The shortage of shipping space and the need to give priority to human food had involved a severe reduction in imports of animal feeding-stuffs until, with the exception of the oilcake manufactured from imported oilseeds, they almost ceased. This led to a heavy fall in the numbers of pigs and poultry, but milk production was encouraged and the acreage under foods with a high calorie and protective value, particularly wheat, potatoes, sugar beet, carrots and green vegetables, was expanded. The nutritional aim of this policy was to secure the maximum increase in the output of food for human consumption, and in particular to maintain the supply of milk and to provide abundant supplies of bread and potatoes as cheap sources of energy.

27. These developments took place against a background of increasing inflationary pressure. By the middle of 1941 unemployment had almost disappeared and average weekly earnings had risen by over 40 per cent compared with October 1938. The general rate of increase in wages was much greater than that in salaries and among the workers relatively large increases were secured by those in occupations such as agriculture and coal-mining which were among the lowest paid before the war. Earnings of women rose by a larger percentage than those of men and both were far outstripped by the relative increase in the pay of juveniles. Increases in direct taxation had a similar levelling effect and also served to mitigate in some degree the pressure of purchasing power on prices. But effective demand continued to grow while supplies dwindled and the resulting rising price level brought with it a succession of claims for further increases in wage rates.

¹ For those workers for whom canteens could not be provided, chiefly miners and agricultural workers, an extra ration of cheese was allowed in 1941.

² See paragraphs 35 and 59 below.

³ See paragraph 136 below.

⁴ See paragraph 79 below. Priority arrangements were also introduced in the distribution of the intermittent supplies of oranges. See paragraph 88 below.

28. In order to hold the inflation in check as far as possible the Government greatly widened the scope of its price control measures during 1941 and maximum prices were fixed not only for the staple foods but for many minor articles which it had previously been judged unnecessary to control. At the same time, under the stabilisation policy announced in April 1941, the Government undertook to extend the system of subsidies, where necessary, to the principal articles of consumption and to stabilise the official Cost of Living Index Number within the range of 25 to 30 per cent above the level of 1st September 1939. The index was held stationary for two years.

29. The general effect of these measures was that by the end of 1941 the pattern of rationing, price control and food supplies was set in the lines which it was to retain, with comparatively unimportant changes, for the remainder of the war. The extent of the change brought about in the diet can be gauged from the estimates of food supplies moving into civilian consumption provided in "Food Consumption Levels in United Kingdom" Cmd. 7842, December 1949.¹ Table 4² compares consumption during 1940 and 1941 with the pre-war period. The pre-war tendency towards increased consumption of fish, meat, fats, eggs, sugar and fruit had been strikingly reversed. On the other hand the quantities of dairy products, potatoes and cereals had increased.

TABLE 4
Food supplies moving into Civilian Consumption as estimated in "Food Consumption Levels in the United Kingdom", Cmd. 7842

Percentage change in 1940 and 1941 compared with before the war

Food showing an increase in 1941			Food showing a decrease in 1941		
	1940 %	1941 %		1940 %	1941 %
Grain products ...	+ 7	+22	Fruit	-24	-58
Potatoes	- 5	+ 7	Fish, poultry, game ...	-31	-39
Dairy products ...	0	+ 6	Sugar and syrup ...	-29	-35
Vegetables	- 8	+ 1	Meat	-10	-22
			Pulses and nuts ...	-28	-22
			Eggs	- 7	-20
			Fats (butter, etc.) ...	- 9	-12
			Beverages	+ 6	- 1

30. Complementary to the internal measures described above was the passing of the Lend Lease Act in the United States early in 1941, which removed the immediate financial difficulty in the way of obtaining supplies from dollar sources. From that time onward, American food production was increasingly geared to the requirements of war. Shipping tonnage was still restricted and the Battle of the Atlantic continued to take a severe toll of food shipments but, during 1942, supplies increased both in quantity and quality. The most critical period of the war, so far as the diet was concerned, was over.

The Urban Working-Class Diet 1940 to 1941

31. The introduction of the Wartime Food Survey coincided with the fall of France. The first Survey was made in July 1940, and it is possible at this point to pick up the story of the development of the national diet as reflected in these working-class food budgets.

¹ These estimates are referred to in this report since they provide a useful indication of general trends and, for example, a measure of the nutrient intake before the war (see paragraph 43 below). They are general supply estimates and naturally are not limited to supplies going only to urban working-class households. The method of compilation and comments on their validity are set out fully in the first Food Consumption Levels Report, "Food Consumption Levels in the United States, Canada and the United Kingdom," 1944.

² Based on Cmd. 7842, Table I.

32. The 1940 and 1941 Surveys covered a rural area in addition to the selected urban districts but, for the sake of comparability with later results, the figures relating to the rural households are not included in the tables given in this Report. The towns from which the urban sample were first selected were London, Reading, Birmingham, Cardiff, Liverpool, Sheffield and Glasgow. During the second and later quarters of 1941, Exeter, Great Yarmouth, Nottingham and Bishop Auckland were added, and Warrington was substituted for Liverpool, where heavy air-raids had interfered with field work. In these Surveys, an attempt was made to obtain records from the same households quarter by quarter. About 65 per cent of the households surveyed in October 1940 had taken part in the July inquiry and during 1941 about 35 per cent of the households surveyed in the first quarter reappeared in each subsequent quarter.¹

33. Certain changes took place during this period in the average size of the households surveyed and in their average number of children. These changes were probably due largely to evacuation. But the omission after the first quarter of 1941 of Liverpool, where the samples had contained a relatively larger number of children per household than the other towns, and the inclusion of the additional towns where they tended to contain fewer, slightly exaggerated the fall in the number of children.

34. The results of the Surveys are summarised in Tables 5, 6, 7 and 8. There is evidence from Table 5 of an increasing consumption of milk, margarine, potatoes and, in a smaller degree, of bread, and a falling consumption of meat, eggs, butter and sugar. The purchases of potatoes in July 1940 were probably influenced by the loss of the Channel Islands new potato crop owing to the German occupation, in addition to the normal seasonal scarcity in that month, but when the autumn months of 1940 are compared with the autumn of 1941, an increase in the quantities purchased is clearly evident. The figures for the purchases of bread are affected by the proportion of towns in the sample where the homebaking of bread was prevalent. This practice was found to be common in Sheffield and Bishop Auckland. Purchases of bread in these towns were only a little over half the quantities bought per head in the whole sample, the difference being offset by larger purchases of flour. The extension of the sample after the first quarter of 1941 raised the proportion of households from home-baking areas from about 15 per cent to about 20 per cent of the whole sample, and thus slightly impairs the comparability of the figures for successive quarters.

35. The average purchases of milk, which included milk supplied both under the National Scheme and the Milk-in-Schools Scheme, are consistently higher in 1941 than in 1940, and do not appear to be affected by the changes in the sample. During the period covered by these results the National Milk Scheme, launched in July 1940, was coming into operation and by the last quarter of 1941, when restrictions on the supply of milk to ordinary consumers were already in force, 22.4 per cent of all the liquid milk supplied to the surveyed households was obtained under one or other of these two schemes. The average amount of National Scheme milk was 6.5 pints a week for each child under 5, and of school milk 1.4 pints for each child aged 6 to 14. One effect of the expansion of these schemes at a time when the supply of milk to ordinary consumers was restricted was to raise the average amounts taken per head in households with children above the amount taken in childless households. This difference in favour of households with children appeared for the first time in the fourth quarterly survey in 1941.

¹ The collection of records from the same households in successive surveys was not continued after 1943. See paragraph 52 below.

TABLE 5
Domestic Purchases of certain Foods 1940-1941

per head per week

	1940		1941				Average 1941
	July	Oct.	Jan.- Feb.	April- June	July- Sept.	Oct.- Dec.	
Milk (liquid) ... pt.	2.8	3.1	3.3	3.2	3.4	3.2	3.3
Cheese ... oz.	3.0	2.7	1.4	1.1	2.2	2.9	1.9
Meat (excluding of- fal, poultry, rabbits and meat products) oz.	18.1	19.0	13.0	12.1	14.1	14.2	13.4
Bacon and ham ... oz.	3.1	2.8	3.8	3.9	3.9	3.9	3.9
Fish (fresh, dried and fried) ... oz.	4.9	3.4	4.0	4.2	5.9	4.5	4.7
Eggs (shell) ... no.	2.7	2.0	1.9	2.0	1.0	0.6	1.4
Butter ... oz.	3.4	1.8	1.9	3.6	1.9	1.9	2.3
Margarine ... oz.	3.6	3.9	4.4	3.0	4.4	4.7	4.1
Sugar ... oz.	10.6	7.9	8.0	8.0	8.1	10.1	8.6
Preserves (including syrup and treacle) oz.	4.3	3.3	4.8	2.7	4.7	3.9	4.0
Potatoes (including chips) ... oz.	48.7	62.4	69.0	72.5	61.2	74.7	69.4
Bread (a) ... oz.	58.1	57.6	60.6	60.8	61.3	59.2	60.5
Flour ... oz.	11.5	10.5	12.4	13.9	12.3	12.9	12.9
Flour plus flour in bread (b) ... oz.	56.1	54.8	59.0	60.6	59.4	58.4	59.4
Tea ... oz.	2.1	2.0	2.0	2.0	2.0	2.0	2.0
Average number of persons per household	3.61	3.63	3.62	3.44	3.44	3.41	3.46
Average number of children under 14...	0.88	0.89	0.89	0.74	0.77	0.77	0.79

(a) Includes rolls, bread crumbs, currant and malt bread, small quantities of brown flour, rusks and crispbread.

(b) 130 oz. of bread taken as equivalent to 100 oz. of flour.

36. The extent of the changes in the diet represented by these results can be judged only by comparing them with corresponding pre-war figures. It is not easy to find suitable pre-war data for this purpose. A number of budgetary and consumption studies were undertaken before the war, but many of them were limited in purpose and confined to particular localities or to particular types of household. The only pre-war studies providing data which can be taken as in any degree representative of urban working-class households throughout the country seem to be the four surveys described in the following paragraphs. The results of these surveys have been used in the comparison attempted in Table 6.

37. In 1936, Orr¹ classified the results obtained from 1,152 budgets, spread over Great Britain, into income groups obtained by dividing estimated total family income by the number of members in the family. A broad average for the working-class can be obtained by combining Orr's income groups I-IV which account for approximately 70 per cent of the population. But when comparing the results with those of the Wartime Food Survey it must be remembered that Orr's pre-war budgets were collected only during the spring and early summer months and were overweighted by the industrial north and by

¹ *Food, Health and Income*, 1936.

families with many dependants. Moreover, between the time of Orr's inquiry (1932-1935) and the eve of the war, certain conditions affecting the diet generally had changed. In particular, real incomes had risen.

38. The budgetary inquiry of Crawford and Broadley¹ covered nearly 5,000 households, but was limited to the period from October 1936 to March 1937 and, so far as the urban sample was concerned, to seven large towns. Within these limits, a fairly representative sample was obtained by a process of social class stratification, based mainly on the income of the principal earner. This was considered to a satisfactory measure of the social standing of the whole family, but it does not take into account the number of dependants. The figures used in Table 6 to represent the working-class are the weighted averages of Crawford and Broadley's classes C and D which covered about 75 per cent of the population.

39. The inquiry undertaken during 1937-1938 by the Ministry of Labour as a basis for revising the Cost of Living Index² was more extensive. A random sample of over 30,000 adult wage earners and small salary earners throughout Great Britain was selected from the register of workers insured against unemployment and from similar groups not covered by the insurance scheme such as railway and local government employees. About one-third of the households were found to be unsuited to the purpose of the inquiry (for example, households where the housewife was also an earner) leaving a sample of 21,000. A log-book was left with each of these households in which to record food expenditure for the week ending 23rd October 1937 and the same households were asked for a similar record in January, April and July, 1938. In this way, nearly 9,000 family budgets covering the whole year were collected, or about 40 per cent of the eligible households in the sample. This Survey is valuable as a guide to the pre-war working-class consumption and expenditure habits because of its wide geographical spread and the large number of households covered. Its usefulness for the present comparison is nevertheless limited by the fact that the quantities of foods bought were not always stated and that the omission of families dependent on an old age pension or those in which, at the time of the selection of the sample, the heads of the households "were known to be applicants for unemployment assistance" resulted in an under-representation of the poorest households.

40. Finally, Table 6 also gives data obtained from a dietary survey made by the Rowett Research Institute with a grant from the Carnegie United Kingdom Trust. The results of this Survey have not yet been published and have been included in this Report by courtesy of the Rowett Research Institute. This Survey was continuous over the period January 1937 to April 1939 and the method employed was more precise than that of any of the other surveys mentioned. Account was taken of the stocks of food in each household at the beginning and end of the Survey and allowances were made for wastage. The families surveyed were mainly working-class, but the inquiry was directed specifically towards households with school children and in the areas visited those with a high rate of unemployment were over-represented. The results in consequence, reflect unduly the food consumption of the larger and poorer families. A total of approximately 1,700 budgets were collected, including 460 in a repeat survey, but at present a summary of results is available only for the first 1,111. The average size of family providing these budgets was 5.9 persons compared with 3.8 in the Ministry of Labour Survey.

¹ *The People's Food*, 1938.

² Ministry of Labour *Gazette*, December, 1940.

TABLE 6
Domestic Purchases of certain Foods before the War

per head per week

	Orr 1932- 1935 Groups I-IV	Crawford and Broadley 1936- 1937 Classes C and D	Ministry of Labour 1937- 1938 Industrial Workers	Carnegie 1938- 1939 (i)	Ministry of Food 1941
Milk (liquid) pt.	2.3	2.4	3.0	1.8	3.3
Cheese oz.	2.5	2.6	3.0 (g)	1.7	1.9
Meat(excludingoffal,poultry, rabbits, etc., and other meat products) oz.	15.4	19.8	19.9	21.4 (j)	13.4
Bacon and ham oz.	3.9	4.3	5.9	2.9	3.9
Fish (fresh, dried and fried) oz.	3.7 (a)	5.8	(e)	5.7	4.7
Eggs (shell) no.	3.5	3.6	3.7	2.6	1.4
Butter oz.	6.6	6.7	7.6	2.6	2.3
Margarine oz.	2.7	2.7	3.0	5.0	4.1
Sugar... .. oz.	17.4	16.5	20.4	15.5	8.6
Preserves oz.	5.5	5.0	4.2 (h)	4.5	4.0
Potatoes oz.	54.1 (b)	61.6	58.5	60.0	69.4
Bread (white and brown) ... oz.	(c)	56.4	57.3	(e)	60.5 (k)
Flour oz.	(c)	13.3	18.7	(e)	12.9
Flour plus flour in bread ... oz.	63.5 (d)	56.7 (f)	62.8 (f)	64.0	59.4 (f)
Tea oz.	2.5	3.4	3.0	(e)	2.0
Average No. of persons per household	(e)	(e)	3.77	5.90	3.46

(a) Excludes purchased fried fish.

(b) Excludes purchased chipped potatoes.

(c) Included under "flour plus flour in bread."

(d) Excludes the flour content of cakes and biscuits.

(e) Not available.

(f) 130 oz. of bread taken as equivalent to 100 oz. of flour.

(g) Excludes fancy and processed cheese.

(h) Jam and marmalade only.

(i) Actual consumption.

(j) Includes canned meat and poultry.

(k) See note (a) Table 5.

41. The food purchases recorded in 1941 were in general appreciably less than the corresponding results obtained by Crawford and Broadley and by the Ministry of Labour in the immediate pre-war years, with the significant exceptions of milk, margarine, potatoes and bread. The reductions were greatest for butter and eggs (60 to 70 per cent) and sugar (50 to 60 per cent). The consumption of meat and tea appears to have been reduced by about one third, and that of cheese by one-quarter to one-third. Consumption of fruit must have been considerably reduced owing to the restriction of imports, but no detailed comparison is possible except for oranges, where purchases in 1941 amounted to 0.6 oz. per head compared with 5.5 oz. recorded in the Ministry of Labour Survey. Comparison with the Carnegie figures, representing a pre-war sample of the bigger and poorer families, naturally gives a different picture, showing a large reduction in consumption of sugar and eggs, but relatively small reductions in several of the other important foods. In some respects, and especially in regard to consumption of such highly prized foods as fats, eggs, meat and sugar, the average working-class diet of 1941 compared unfavourably with that found among the poorer working-class families before the war. On the other hand, the increased consumption of milk and potatoes, and the higher vitamin content of margarine and bread, represent a distinct

nutritional improvement, while the general effect of rationing and rising incomes, together with such special distribution schemes as that introduced for milk, must have narrowed the range of variation between rich and poor and brought consumption into closer conformity with needs.

42. The energy and nutrient value of the urban working-class diet as recorded in the 1940 and 1941 Surveys is given in Table 7. The calculations are based in the main on the values proposed in War Memorandum No. 14 of the Medical Research Council, "Nutritive Values of Wartime Foods."¹ It is seen that no great changes occurred during this period and that despite the worsening of the supply position at the time there is no evidence of any significant deterioration in the nutritive value of the diet.

TABLE 7
Energy Value and Nutrient Content of Domestic Food Consumption
1940-1941 (a)

per head per day

	1940		1941				Average 1941
	July	Oct.	Jan.- Feb.	April- June	July- Sept.	Oct.- Dec.	
Energy value ... Cal.	2,398	2,311	2,354	2,289	2,334	2,380	2,339
Total protein ... g.	76	77	76	72	74	75	73
Animal protein ... g.	34	35	31	28	30	31	29
Calcium ... mg.	598	630	619	567	603	632	605
Iron ... mg.	12.5	13.0	13.0	12.0	12.1	12.4	12.4
Vitamin B ₁ ... mg.	1.21	1.15	1.18	1.15	1.24	1.16	1.18
Riboflavin ... mg.	1.46	1.51	1.44	1.37	1.39	1.42	1.40
Nicotinic acid ... mg.	11.9	12.8	12.3	11.4	11.7	12.3	11.9
Vitamin C ... mg.	105	95	60	46	109	90	76
Vitamin D ... i.u.	129	105	131	82	94	72	95

(a) Figures for vitamin A not available.

43. None of the pre-war surveys provides a record of quantities suitable for comparison, using present tables of food composition for the purpose of conversion, with the wartime results in terms of nutrients.² Moreover, the factors used in the original publication of the results are not wholly acceptable to-day. It is however possible to observe trends in the nutrient composition of the diet in the estimates provided by the report of a Special Joint Committee set up by the Combined Food Board and published as "Food Consumption Levels in the United States, Canada and the United Kingdom," 1944 and brought up to date by the Ministry of Food in successive editions of "Food Consumption Levels in United Kingdom."³ The estimates of protein (Table 8) reflect the increased consumption of bread and the fall in that of meat and other animal foods. The vitamin B₁ content increased as a result of raising the extraction rate of flour to 75 per cent. There was a fall in the supply of butter and liver for which increased supplies of carrots only partially compensated, so that the total vitamin A content fell, and the decrease in the supply of fresh fruit resulted in a fall in vitamin C. The apparent fall recorded in the energy value of the diet may, to some extent, represent a reduction in waste; it must be remembered moreover that the wartime civilian population contained an abnormally low proportion of active men and women and a relatively high proportion of women, children and elderly persons.

¹ See paragraph 117 below.

² Except the Carnegie Survey (see paragraph 40 above). The comparison with the results of this Survey will be considered in detail in a subsequent report.

³ See paragraph 29 above.

TABLE 8

Energy Value and Nutrient Content of Food Supplies moving into Civilian Consumption as estimated in "Food Consumption Levels in the United Kingdom", Cmd. 7842, 1940 and 1941 expressed as percentage of pre-war (a)

	1940	1941
	%	%
Energy value	93	94
Total protein	99	103
Animal protein	90	84
Vegetable protein	109	126
Calcium	98	101
Iron	102	104
Vitamin A	92	90
Vitamin B ₁	108	125
Riboflavin	100	100
Nicotinic Acid	102	97
Vitamin C	90	84

(a) Figures for vitamin D not available.

The Wartime Diet after 1941

44. It was not until after 1941 that the effects of Lend Lease supplies began to be felt. Although the Lend Lease Act was passed early in 1941, supplies did not become available until that summer when cheese, lard, canned meats and canned fish began to arrive. And, before the year was out, United Kingdom food supplies received a further check with the entry of Japan into the war. The subsequent conquest of South-East Asia reduced supplies of rice, tea, sugar and vegetable oils; and a proportion of the Australian and New Zealand food output (particularly meat and dairy produce) had to be diverted to meet the requirements of the armed forces in the Pacific area. But with Lend-Lease arrangements coming fully into operation and with the new impetus given by the Japanese attack to American food production, the flow of foods across the Atlantic increased so considerably that further deterioration in the diet was prevented and an improvement began. The general position, based on estimates of civilian supplies in Food Consumption Levels in United Kingdom, Cmd. 7842, is shown in Table 9.

TABLE 9

Food Supplies moving into Civilian Consumption as estimated in "Food Consumption Levels in the United Kingdom," Cmd. 7842

lb. per head per annum

	Pre-war	1941	1942	1943	1944	1945
Dairy products (milk solids) ...	38.3	40.7	48.6	50.0	49.0	49.8
Meat (edible weight)	109.6	85.6	89.6	86.4	96.1	86.6
Fish, game, etc. (edible weight)	32.8	20.0	20.5	21.6	23.5	27.8
Eggs and egg products (shell egg equivalent)	24.0	19.2	21.0	22.1	23.2	26.1
Oils and fats (fat content) ...	45.3	39.9	39.6	37.9	39.0	37.0
Sugar and syrup (sugar content)	109.9	70.9	72.1	71.6	75.7	74.1
Potatoes	176.0	188.2	224.9	248.8	274.6	260.2
Tomatoes and fruit	141.4	59.7	94.2	77.9	93.6	90.9
Vegetables	107.5	109.1	119.6	117.1	124.8	127.1
Grain products	210.1	257.2	245.7	248.9	252.8	258.0
Pulses and nuts	9.6	7.5	6.1	6.0	6.8	6.3
Beverages	14.7	14.6	14.0	11.5	12.8	13.7

45. This improvement in the diet not only raised its nutritional quality but, by adding a welcome measure of variety, increased its psychological appeal. Some of the additional foods were new to the British consumer and presented an administrative difficulty. Their quantity was insufficient for unrestricted distribution and their variety made them unsuited to the existing rationing systems. This difficulty was met by the "Points Scheme" under which these foods were sold according to an announced scale of points, and the consumer was able to choose where and on what to expend a limited entitlement of points coupons. This scheme was introduced in December 1941, in time to deal with the new restrictions of supply imposed by the extension of the war to South-East Asia. Before the end of the war points rationing covered canned foods (meats, fish, fruit, vegetables), dried fruits, rice, sago, tapioca, dried pulses, condensed milk, cereal breakfast foods, oatflakes, rolled oats, treacle, syrup, imported canned marmalade and honey and biscuits.

46. During 1942 few changes were made in rationing beyond the introduction of a "personal points" scheme for chocolate and sugar confectionery by which the consumer purchased these articles where he chose up to the value of his points. But efforts were made to secure additional economies in the production and distribution of foods. Thus the retail distribution of milk was "rationalised" by allocating areas to dairymen in order to eliminate overlapping rounds and schemes for concentrating the production of certain foodstuffs were introduced. The consumption of food in catering establishments was further restricted although the priority allocation to workers' canteens continued. The effects on the diet of these and similar measures were indirect, their chief object being to release men, materials and factory space for the armed forces and for the manufacture of munitions; but the more economical use of foodstuffs helped to maintain supplies and it was possible in some cases, for example soft drinks, to increase production despite the use of smaller quantities of raw materials. Other measures were designed to save shipping space. Dried eggs were imported and first sold to the public during 1942 and meat carcasses were boned and compressed before shipment. The extraction rate for flour was again raised in March 1942 to 85 per cent, and when it was seen that there would be an abundant home crop of oats and barley, a proportion of these grains was also added to flour. With flour of this high extraction rate it was no longer necessary to add synthetic vitamin B₁ to bread.¹ On the other hand, in May, it was decided to add calcium carbonate in order to counteract the possible effect of the higher extraction rate in reducing the availability of the calcium present in the diet and bread and flour became the chief single source of calories, protein, iron, vitamin B₁ and nicotinic acid and second only to milk as a source of calcium (*see* Table 37).

47. The diet continued to improve during 1943 and by the end of that year the wartime system of food control reached its fullest development. Raw materials and production generally were subject to some form of control and maximum prices were enforced for nearly all foods. There were then only three groups which remained unrationed at the retail stage; foods, such as perishable foods, for which rationing was regarded as administratively impracticable; foods of minor importance for which rationing was considered unnecessary; and foods of major importance which it was considered essential to maintain in unrestricted supply. The first group included fish and fruit, which became very scarce owing to restrictions of supply; fresh vegetables (other than potatoes) which despite the increased acreage devoted to their production were not always readily obtainable; and, for example, cakes. The principal items of the second group were beverages (other than tea), sausages, poultry, game and rabbits, meat pies and cakes. Restaurant meals

¹ *See* paragraph 22 above.

fell in one sense into the third group, though supplies of food to ordinary restaurants were subject to stringent allocation. But the principal constituents of the third group were bread, flour, oatmeal and potatoes. The free availability of these foods without rationing was a cardinal aim of wartime food policy.

48. The Mediterranean was reopened in 1943 and this helped the further improvement in supplies during 1944. Citrus fruit, sardines and vegetable oils began to arrive and supplies of dried eggs, canned meat, canned and frozen fish also increased. It was found possible to double the jam ration and for a time to increase the bacon ration. On 31st December the extraction rate of flour was reduced to 80 per cent. Only cheese was in such short supply that it was necessary during the summer to reduce the ration.

49. By 1945 the general improvement which had marked the years since 1941 was checked. The world food crisis of the early post-war years which was brought about by the cumulative effects of the war was already beginning to make itself felt. Agriculture everywhere was suffering from acute shortages of labour, machinery and fertilisers. The peoples of the liberated and the occupied territories had to be fed, at least partly, from Allied resources. Countries devastated by war were not in a position for some time to make an adequate contribution to world supplies and even where production was satisfactory lack of shipping space (due to the extraordinary demands of military operations in 1945) hindered proper distribution. Moreover, in many countries, the standard of consumption now accepted as desirable was far above the pre-war level and wages and salaries were still rising. In April 1945 the Combined Food Board (set up in 1942 to pool the food resources of the allies) reviewed the position of the territories other than those under the control of Japan, and found the following deficits for a number of important foods.

TABLE 10
Estimates of World Deficit of Certain Foods anticipated for 1945 (a)

	000 tons	As percentage of supplies
		%
Meat and bacon (carcase weight equivalent)...	1,795	11.8
Canned fish (July first pack)	383	91.6
Cheese	96	13.6
Canned milk (full cream)	425	21.3
Milk Powder (full cream and skimmed)	149	32.7
Fats and oils (edible and technical)	1,437	25.3
Sugar (refined)	1,853	23.0

(a) From a statement by the Ministry of Agriculture reported in the Ministry of Food Bulletin No. 296 of May 25th, 1945.

50. The position was aggravated by adverse weather during 1945 when a bad winter in the United Kingdom was followed by an unusually wet spring, making it difficult to collect vegetable crops, and droughts occurred in some of the Dominions and in the Argentine. United Kingdom food supplies were also seriously affected by the termination of Lend-Lease in August. Nevertheless food whose procurement had already been arranged under Lend-Lease continued to provide a flow of supplies which did not cease until July 1946. Stocks of food held in this country were allowed to fall to very low levels and it was possible to prevent extensive cuts in food consumption. The full impact of the world food crisis was not felt until 1946 and 1947.

The National Food Survey 1942 to 1945

51. The methods of the Survey were revised after the completion of the 1941 inquiries and, from the beginning of 1942, the measurement of larger stocks

of food was introduced. Records of quantities purchased could then be adjusted by the amount of the change in household stocks to give a more accurate estimate of consumption. Details are given in Appendix A¹ of the results of a comparison over several years between estimates of consumption reached in this way and the recorded purchases by the households taking part in the Survey. These results show that quantities consumed tended to exceed quantities purchased. The difference varied with season and was larger for some foods than others, but it was found on the average to exist at all periods of the year for the households surveyed. It was due presumably to a tendency for housewives when taking part in the Survey to purchase rather less than their usual quantities during the survey week owing to the time and trouble involved in keeping the records. For this reason, the estimates of consumption reached after allowing for stock changes must be considered more accurate than the records of purchases alone and, except where otherwise stated, all survey consumption figures given in this Report for 1942 and later years are based on estimates arrived at in this way.

52. Certain variations in the sample occurred during these years. Although the number of towns was raised from 11 (with the rural area) in 1941 to 20 in 1942, the general working-class sample during certain months of 1942 was drawn only from 10 of these towns.² There were slight differences between these 10 towns and the remainder of the sample in food expenditure and in numbers of children which may affect certain of the annual averages, but for most purposes these differences may be disregarded. During 1943 the survey covered over 9,000 households drawn from 22 towns and formed a continuous urban working-class sample of a more homogeneous character. In one respect the increasing employment of women during the war raised a difficulty. Housewives refused to co-operate on the ground that they were too busy and it was found that the repeat samples in particular contained an undue proportion of households of certain types, such as pensioners' households and households with young children. For these reasons, the attempt to secure a succession of records from the same household was abandoned and from the beginning of 1944 no household appeared more than once in the survey sample for any year. In 1944 and 1945 the number of households was reduced to between 7,000 and 8,000 drawn from 25 towns in 1944 and 42 towns in 1945.

53. The numbers and composition of the households surveyed from 1942 to 1945 are summarised in Table 11. These numbers are influenced by the call up of adults for national service and by the evacuation of children from towns,³ as well as by normal sampling fluctuations. The abnormal composition of the 1944 households may be partly due in addition to a change in sampling methods made at the beginning of the year. In previous years, all the households included in working-class samples were resident in districts judged to be predominantly working-class in character but, from the beginning of 1944, in consequence of the introduction of a regular non-working-class sample, a proportion of the working-class sample consisted of households resident in mixed middle and working-class wards. This seems to have resulted in certain measurable changes in the sample; for example, in a small but statistically significant increase in the proportion of households where the chief earner was a clerical worker, shop-assistant or employee of national or local government, and a marked decline in the proportion of working-class households in districts classified for survey purposes as "slums". The sample during 1944 and 1945 may therefore have represented a slightly higher social class of the population than previous samples.

¹ Appendix A, Paragraphs 35 to 37.

² A part of the investigating team was assigned during two of the five periods into which the year was divided to the collection of records from special samples of households.

³ As explained in the Introduction, paragraph 7 above.

TABLE 11
Composition of Urban Working-class Households included in the National Food Survey 1942-1945

	Number of Households	Average number of persons per household			
		Adults (over 21)	Adolescents (14 and under 21)	Children (under 14)	Total
1942	8,567	2.20	0.37	0.87	3.44
1943	9,141	2.18	0.36	0.93	3.47
1944	7,623	2.23	0.31	0.86	3.41
1945	7,225	2.18	0.33	0.94	3.45

The Urban Working-Class Diet 1942 to 1945

54. The average domestic consumption¹ of the principal foods in the households surveyed from 1942 to 1945 is summarised year by year in Table 12. The main features revealed by this table are the general increases in consumption of most foods from 1942 to 1944, and the fall in consumption of meat, fats, preserves and potatoes from 1944 to 1945.

TABLE 12
Domestic Consumption of Principal Foods 1941-1945

						<i>per head per week</i>		
	1941 (a)	1942	1943	1944	1945	As percentage of 1942		
						1943	1944	1945
						%	%	%
Milk (including dried and condensed) pt.	3.6	3.8	4.3	4.4	4.4	113	116	116
Cheese oz.	1.9	3.6	3.1	2.6	2.5	86	72	69
Meat and meat products (including bacon) oz.	28.6	26.3	26.2	28.3	26.4	100	108	100
Fish (including canned) oz.	5.8	6.6	6.5	7.6	9.2	98	115	139
Eggs (including dried) no.	1.4	1.4	2.2	2.9	3.0	157	207	214
Fats (butter, margarine and cooking fat) oz.	8.3	8.7	8.7	9.2	8.6	100	106	99
Sugar oz.	8.6	8.4	8.7	9.0	9.1	104	107	108
Preserves oz.	4.0	4.9	5.2	6.1	5.5	106	124	112
Potatoes oz.	69.4	68.5	71.2	71.3	68.5	104	104	100
Other vegetables (including canned) oz.	30.0	31.3	34.4	37.3	36.3	110	119	116
Fruit (including canned) oz.	7.7	12.3	12.8	14.0	15.9	104	114	129
Bread, flour and other cereal foods oz.	86.5	81.5	81.2	83.3	85.5	93	95	98

(a) Based on purchases.

55. There was a general improvement up to 1944 in the nutritional value of the diet (Table 13) as a result particularly of the progressive increases in the consumption of calcium, iron, vitamin B₁, riboflavin and nicotinic acid. These were chiefly due to the increases in the extraction rate of flour together with the addition of calcium carbonate, and to the steadily expanding milk consumption. In 1945 this improvement was checked. A decreased consumption

¹ The term domestic consumption, as used throughout this Report, refers to foods purchased together with supplies obtained free for consumption in the home and withdrawals from larder stocks, excluding sweets, ices, alcoholic and certain soft drinks, but including meals packed in the home for consumption outside. (See Introduction, paragraph 4). Welfare Foods distributed by the Government are excluded (see paragraph 136) with the exception of Welfare and School milk (see paragraph 116).

of iron, vitamin B₁, riboflavin and nicotinic acid resulted from the reduction of the flour extraction rate to 80 per cent, and a fall in the quantity of liver in the diet was chiefly responsible for a lower vitamin A consumption. In spite of these decreases the diet in that year was still substantially better than in 1941.

TABLE 13
Energy Value and Nutrient Content of Domestic Food Consumption

per head per day

	1941	1942	1943	1944	1945
Energy value Cal.	2,339	2,269	2,272	2,387	2,375
Protein g.	73	74	73	73	76
Fat... .. g.	(a)	(a)	86	94	92
Calcium mg.	605	672	855	868	875
Iron mg.	12.4	13.5	13.3	13.5	12.7
Vitamin A i.u.	(a)	2,982	3,071	3,173	2,908
Vitamin B ₁ mg.	1.18	1.40	1.55	1.52	1.47
Riboflavin mg.	1.40	1.54	1.64	1.76	1.58
Nicotinic acid mg.	11.9	11.9	12.7	13.9	13.2
Vitamin C mg.	76	76	83	87	86
Vitamin D i.u.	95	100	112	106	143

(a) Not available.

56. Some of the nutritional effects of the wartime measures may be illustrated by a review of the position at the end of the war. Table 14 shows, for 1945, the relative contributions of different foods to the average urban working-class household diet. Foods which were rationed or subject to some form of controlled distribution had come to account for more than half of the total intake of fat, calcium, riboflavin and vitamin D. Point-rationed foods together contributed less than 10 per cent of the calories and of most nutrients, but their value in giving palatability and variety to the diet was important. Milk provided almost half the calcium, and fresh vegetables contributed more than one-third of the supply of vitamins A and C.

TABLE 14
Proportions of Energy Value and Nutrients in Domestic Consumption derived from Rationed and Unrationed Foods 1945

	Calories	Protein	Fat	Calcium	Iron	Vit. A	Vit. B	Riboflavin	Nicotinic Acid	Vit. C	Vit. D
RATIONED FOODS (a)	%	%	%	%	%	%	%	%	%	%	%
By weight or value ...	29.2	16.1	55.9	10.2	15.6	29.1	11.7	16.0	22.8	—	42.3
Points foods... ..	7.3	7.5	6.0	5.4	12.4	1.6	6.7	4.5	7.1	—	21.1
Milk and Eggs ...	10.5	18.7	15.8	49.7	7.7	19.4	12.6	41.8	3.2	4.1	12.7
Total	47.0	42.3	77.7	65.3	35.7	50.1	31.0	62.3	33.1	4.1	76.1
UNRATIONED FOODS											
Bread and flour ...	30.5	32.8	3.5	20.0	29.9	—	35.4	10.1	26.5	—	—
Potatoes	7.5	5.8	1.1	2.3	10.5	—	19.1	9.4	17.3	41.9	—
Fresh vegetables ...	1.0	2.2	—	5.1	6.1	34.3	4.9	5.0	5.6	42.9	—
Other foods	14.0	16.9	17.7	7.3	17.8	15.6	9.6	13.2	17.5	11.1	23.9
Total	53.0	57.7	22.3	34.7	64.3	49.9	69.0	37.7	66.9	95.9	23.9
	100	100	100	100	100	100	100	100	100	100	100

(a) *I.e.* either rationed or subject to some form of controlled distribution.

Consumption of Individual Foods 1942 to 1945

57. In the following paragraphs the changes in the consumption of individual foods are discussed in greater detail.

MILK

58. Although sales of milk off farms did not rise above the pre-war level until 1943, the reduction in the quantities processed into cheese and other milk products made possible a steadily increasing liquid milk consumption (Table 15). The survey results show that by 1945 the average consumption among the working-class households surveyed was 4.1 pints per head per week, or more than one-third greater than the average of 3.0 pints recorded in 1937-1938 by the Ministry of Labour.

59. This remarkable increase is to be attributed partly to the wartime rise in incomes and the shortage of many other foods, but it was assisted by the provision of cheap and free milk under the National Milk and School Milk Schemes, and by the priority given to children and adolescents under the milk distribution scheme. The National Milk Scheme allowed seven pints of free or cheap milk to all children under five and for all expectant mothers, and the priority allocations in force for most of the period covered by the Table permitted the purchase at full price of five pints per week for each child under one year and of 3½ pints from five to eighteen years, together with the non-priority allowance for expectant mothers. Owing to the seasonal variation in supplies, the proportion of the total consumption which was provided by milk distributed under these arrangements varied from one part of the year to another. In the last quarters of 1944 and 1945 National Scheme and School Milk together represented 30 per cent of all milk consumed by the surveyed households, compared with the proportion of 22 per cent for the last quarter of 1941.

TABLE 15
Domestic Consumption of Liquid Milk 1942-1945

	<i>pt. per head per week</i>			
	1942	1943	1944	1945
Milk retailed at full price ...	2.57	2.81	2.87	2.93
National Scheme Milk ...	0.68	0.87	0.87	0.92
School Milk ...	0.23	0.26	0.23	0.26
Total ...	3.48	3.94	3.97	4.11
Average non-priority allowance ...	2.50	2.64	2.48	2.37

60. Condensed milk was an important item in working-class budgets before the war owing to its sugar content and convenience of storage, and in the working-class households surveyed by Orr and by Crawford and Broadley it provided, in terms of liquid milk equivalent, about 14 per cent of the consumption of milk in all forms. During the war supplies were severely restricted. But from 1943 onwards dried skimmed milk (National Household Milk) was distributed on an increasing scale and dried whole or partly skimmed milk (National Dried Milk) for infants was available under the National Scheme on the surrender of the infants' liquid milk entitlement. Dried whole or partly skimmed milks were also on sale commercially. The consumption of both condensed and dried milk by the surveyed households is given in Table 16; the proportion of condensed milk was about 2 per cent of all types of milk.

TABLE 16
Domestic Consumption of Condensed and Dried Milk 1942-1945

equivalent pt. per head per week

	1942	1943	1944	1945
Condensed unsweetened whole ...	0.07	0.03	0.02	0.02
Condensed sweetened whole ...	0.03	0.04	0.03	0.02
Condensed sweetened skimmed ...	0.04	0.07	0.06	0.06
Dried whole (a)	0.06	0.03	0.05	0.04
Dried skimmed (b)	0.08	0.19	0.28	0.18
Total	0.28	0.36	0.44	0.32

(a) Includes branded dried milk but not patent drinks.

(b) National Household Milk but may include a small amount of liquid skimmed milk.

61. Before the war, consumption of liquid milk varied little during the course of the year, the summer flush creating a surplus which was used for the manufacture of milk products. But during the war years the expanded demand could not be fully met, except for short periods during the summer, and for the greater part of the year consumption by non-priority consumers had to be restricted. As a result, total consumption showed a marked seasonal variation. These restrictions were first imposed during the final quarter of 1941 and the subsequent seasonal changes in consumption are compared in Table 17 with the pre-war seasonal changes recorded by the Ministry of Labour Survey.

TABLE 17

Domestic Consumption of Liquid Milk at Different Seasons: National Food Survey 1941-1945 compared with Ministry of Labour Survey 1937-1938

pt. per head per week

Ministry of Labour Survey		National Food Survey					
		1937-1938 (a)	1941(a)		1943	1944	1945
Week ending:							
Jan. 29, 1938	2.9	Jan. 8—Feb. 16	3.34	First Quarter	3.84	3.70	3.86
April 30, 1938	3.0	Apr. 4—June 26	3.33	Second "	4.11	4.34	4.38
July 23, 1938	3.0	July 18—Sept. 6	3.35	Third "	4.00	4.02	4.26
Oct. 23, 1937	3.0	Oct. 27—Dec. 6	3.17	Fourth "	3.77	3.88	3.96
Range (b)	0.1	Range	0.18		0.34	0.64	0.52

(a) Quantities purchased.

(b) Difference between highest and lowest figures.

62. Since milk provides some of all the important nutrients the substantial increase in milk consumption during the war was of the highest nutritional importance. Table 18 shows that milk supplied about half the total calcium and about one-third of the riboflavin in working-class household diets and that it was an important source of protein, fat, vitamin A and vitamin B₁. The decline in the proportion of the calcium in the diet attributed to milk between 1942 and 1943, was due to the introduction of calcium into bread.

TABLE 18
Proportions of total Energy Value and Nutrients derived from all Milk
in Domestic Consumption 1942-1945

	1942	1943	1944	1945
Energy value (calories)	8.9	9.6	9.3	9.5
Protein	14.9	16.4	16.4	15.8
Fat	(a)	13.7	12.6	13.4
Calcium	56.6	48.7	49.3	49.1
Iron	2.5	2.9	2.6	2.9
Vitamin A	11.9	12.1	11.9	13.3
Vitamin B ₁	10.0	9.7	9.9	10.9
Riboflavin	32.5	33.5	33.0	36.1
Nicotinic acid	2.8	2.9	2.7	2.9
Vitamin C	4.4	4.2	4.0	4.4
Vitamin D	3.2	2.8	3.0	2.8

(a) Not available.

CHEESE

63. Supplies of cheese fluctuated considerably during the war. Before the war, imports accounted for more than three-quarters of the total supplies and when home production was halved to release more milk for the liquid market a slight increase in imports compensated for the loss. When Lend-Lease became operative in 1942, total supplies for the civilian population¹ rose as high as 50 per cent above the pre-war level and, for a short period, were exceptionally abundant. After that year they declined but were still 10 per cent above the 1938 level when the war came to an end.

64. Weekly purchases in 1940 by the households of the Food Survey averaged 2.7 oz. as compared with the average pre-war consumption of 3 oz. recorded in the Ministry of Labour Survey. When first introduced in May 1941 the cheese ration was 1 oz. per head per week. This was raised in August to 3 oz. and during that year the Food Survey recorded average weekly purchases of 1.9 oz. per head. The large quantities available in 1942 made possible an ordinary civilian ration of as much as 8 oz. from July to December but, as is shown in Table 19, this was not fully taken up. Subsequently the ration was reduced. In May 1941 a special ration of 8 oz. (increased to 12 oz. in December 1941) was introduced for agricultural and other workers, for whom normal canteen services could not be arranged, and for vegetarians and diabetics. This special arrangement remained in force throughout the period.

TABLE 19
Domestic Consumption of Cheese 1942-1945

oz. per head per week

	1942	1943	1944	1945
Consumption	3.58	3.07	2.61	2.49
Average level of ration	5.3	3.6	2.5	2.4

65. The 8 oz. cheese ration of August-December 1942 provided one of the few instances in which a ration was not fully or almost fully taken up. An

¹ This and the references to supplies moving into civilian consumption in the following paragraphs are drawn from the latest report, "Food Consumption Levels in the United Kingdom," Cmd. 7842, supplemented by revised figures for 1948 and 1949.

analysis of the results relating to some 2,000 households surveyed between 22nd October 1942 and 6th January 1943 showed that 84 per cent of the households consumed less than 8 oz. per head and one-third of them less than 3 oz. Average consumption among all households surveyed (which may have included a small proportion of persons entitled to the special ration of 12 oz.) was only 4.3 oz. per head. There were strongly marked regional variations. Among five towns in Scotland and North-East England (Aberdeen, Glasgow, Newcastle, Hull and Leeds) over half the households surveyed consumed less than 3 oz. per head, while in 8 towns representative of the Midland and Home Counties area (Birmingham, Derby, Leicester, Nuneaton, Stoke-on-Trent, Luton, Reading and Inner and Outer London) the proportion consuming less than 3 oz. was below one-fifth.

MEAT

66. By 1942 supplies of meat moving into civilian consumption were estimated to have fallen to 80 per cent of the pre-war quantities. Shipping shortage had reduced imports and, at home, food crops and milk production had been encouraged at the expense of meat. Rationing of fresh meat was introduced on 11th March 1940 and for about seven months the adult entitlement was at the rate of 1s. 10d. worth per week. After rising to 2s. 2d. for eleven weeks during the autumn, it was reduced early in January 1941 to 1s. 2d. worth, including pork and offals, which had hitherto been free. For about three months up to the beginning of July there was a further reduction to 1s. worth, but the ration was then raised again to 1s. 2d. at which level it remained throughout the rest of the period. Offals were not included in the ration after 7th July 1941. From time to time canned corned meat was issued in lieu of part of the ration of fresh meat but, until 1945, only insignificant quantities were recorded as consumed by the surveyed households. Throughout the period the ration entitlement for children up to the age of five was one-half the adult entitlement; from July 1943 expectant mothers were entitled to receive this half ration during pregnancy.

67. Since the ration was expressed in terms of value, the quantity of meat it represented varied not only according to the particular cut but according to the kind of meat taken, mutton and lamb being a little cheaper than beef, and both appreciably cheaper than pork. All imported meat was about 2d. per lb. cheaper than home-killed. The proportions in which meat of different kinds were offered depended on the supplies available from time to time, and the consumer had only a limited freedom of choice. The average monthly price paid for rationed meat of all kinds during 1943 and 1944, as calculated from the monthly records of purchases, varied between 15.1d. and 16.9d. per lb.

68. In 1937 to 1938 the Ministry of Labour Survey showed average weekly purchases per head of nearly 20 oz. of carcass meat (excluding offals, poultry, rabbits, game and meat products) among the better paid working-class. The Food Survey recorded an average purchase of 18.5 oz. in 1940 and 13.4 oz. in 1941. Subsequently (Table 20) weekly purchases were about 14 to 14.5 oz.

69. Table 20 shows the expenditure on different types of rationed meat compared with the entitlement. The effect of the Survey is usually to reduce household expenditure during the survey week (*see* paragraph 51 above) but with meat this decrease is only of the order of 1 or 2 per cent. It is nevertheless evident that the amount spent by these households was generally higher than the entitlement, particularly since no allowance has been made in the Table for the number of children included in the sample. Their smaller entitlement would have had the effect of reducing the strict entitlement by about one halfpenny.

TABLE 20
Domestic Consumption of and Expenditure on Rationed Meat 1942-1945

per head per week

	1942	1943	1944	1945
Beef and veal oz.	8.1	7.2	7.0	6.3
Mutton and lamb ... oz.	5.3	6.0	5.3	6.1
Pork oz.	0.4	1.0	1.9	1.4
Canned corned meat ... oz.	—	—	—	0.7
Total	13.8	14.2	14.2	14.5
Expenditure d.	13.4	14.0	14.4	15.1
Ration entitlement... .. d.	14.0	14.0	14.0	14.0

70. Processed meats, offals, rabbits, game and poultry made an important contribution to the total consumption of meat. From 1942 to 1945 about 4 oz. of sausages were consumed per head per week by the households surveyed, but their meat content was much below the customary standard before the war when, according to Crawford and Broadley, consumption was about 3 oz. The consumption of meat offals and of poultry, game and rabbits declined considerably after 1941 (when they accounted for over 6.5 oz.) but from 1942 increased supplies of canned meats procured under Lend-Lease and distributed on points provided some compensation. As a result, miscellaneous meats and meat products at a fairly constant level of consumption of about 8 oz. gave a valuable element of variety to the diet.

TABLE 21
Domestic Consumption of Meat (Offals, Canned Meat, Sausages etc.) 1942-1945

oz. per head per week

	1942	1943	1944	1945
Liver, kidney and other offal ...	1.47	1.60	1.96	1.42
Rabbits, poultry, game, etc. ...	0.99	0.89	1.07	0.96
Cooked meat, bacon and ham ...	0.61	0.40	0.76	0.42
Canned meats	1.38	1.31	1.66	1.64
Sausages	3.99	3.78	4.11	3.87
Total	8.44	7.98	9.56	8.31

71. Supplies of bacon presented a special problem since home production was sacrificed to save feeding stuffs and imports were reduced to 60 per cent of the pre-war level by 1941. Total supplies of bacon and ham moving into civilian consumption fell continuously from about 70 per cent of the pre-war level in 1940 to 60 per cent in 1945, except for 1944 when, for that year alone, they rose abruptly to nearly 90 per cent. Bacon was rationed from January 1940, initially at 4 oz. The ration was raised to 8 oz. from the end of January to the beginning of June and at this level it was above the average pre-war consumption of 5.9 oz. recorded by the Ministry of Labour. From June 1940, it remained at 4 oz., with a brief rise to 6 oz. in August and September 1944, until it fell to 3 oz. in April 1945.

72. From 1940 to 1942 the ration does not appear to have been fully taken up among working-class households but from 1943 to 1945 (Table 22) the average consumption among the surveyed households was slightly in excess of the ration, a fact partly explained by the permission given to retailers to sell such items as bacon ends and ham bones off the ration. The average purchases of 3.6 and

3.3 oz. recorded in the Surveys of July and October 1940 fell short of the ration of 4 oz. by a greater amount than can be accounted for by the normal excess of consumption over purchases as estimated from later surveys. The contrast between these and later figures is no doubt explained by increasing demand due to the scarcity of other kinds of meat as the war proceeded and to the wartime rise in earnings.

TABLE 22
Domestic Consumption of Bacon 1942-1945

	<i>oz. per head per week</i>			
	1942	1943	1944	1945
Consumption	3.95	4.03	4.55	3.54
Average level of ration	4.0	4.0	4.3	3.4

73. The total weekly consumption of all meats and meat products, according to the Survey, averaged about 26 oz. per head from 1942 to 1945, except in 1944, when it rose to 28 oz. In 1941 average purchases were about 29 oz. These figures may be roughly compared with the pre-war averages of about 35 oz. given by Orr and 34 oz. given by Crawford and Broadley, but the comparison is not exact as this food group is heterogenous and the classification may not have been the same.

74. In view of the importance usually attached to meat as a source of protein the figures shown in Table 23 are of interest. During the period under review, meats accounted for about one-fifth of the total protein in the working-class diet. They were of greater importance as a source of nicotinic acid, providing about one-third of the total. They also provided just over a quarter of the total fat, one-fifth of the total iron and useful quantities of vitamin B₁ and riboflavin. The vitamin A in meats is derived largely from liver and the fluctuations in the vitamin A percentages arise from variations in the consumption of liver. Meats provide negligible quantities of calcium, little or no vitamin C and little vitamin D.

TABLE 23
Proportions of total Energy Value and Nutrients derived from all Meats in Domestic Consumption 1942-1945

	1942	1943	1944	1945
	%	%	%	%
Energy value (calories)	14.2	12.4	13.6	12.5
Protein—animal	18.9	19.2	19.2	18.4
Fat	(a)	27.9	29.8	28.2
Calcium	1.7	1.8	1.8	1.7
Iron	23.7	20.3	20.0	21.3
Vitamin A	16.5	17.7	19.8	12.6
Vitamin B ₁	15.0	15.5	18.5	17.0
Riboflavin	15.6	16.5	17.6	15.8
Nicotinic acid	33.6	33.1	34.5	32.6

(a) Not available.

FISH

75. Fishing suffered early in the war from the transfer of trawlers to war service and, with the exception of canned fish, supplies for civilian consumption fell by 1940 to about one-half of the pre-war level. They did not regain that level until the end of the war. Supplies of canned fish, on the other hand, kept nearer to or above the pre-war level, except during 1942.

76. In 1941 the average purchases of fresh, dried, smoked and fried fish recorded by the Survey amounted to 4.8 oz. Between 1942 and 1945 consumption rose steadily from about 6 oz. to over 8 oz. per head per week (Table 24). These amounts are above the pre-war working class consumption of 3.7 oz. (excluding fried fish) estimated by Orr and, in the later years of the war, higher than Crawford and Broadley's estimate of 5.8 oz. That average consumption of fish per head at the end of the war may have exceeded pre-war consumption, although supplies are estimated to have decreased slightly, may have been due to a less wasteful utilisation of these supplies particularly with the scarcity of meat.

77. There is considerable regional variation in the consumption of fish which may affect the averages recorded by the Survey. A higher level of consumption is to be expected in coastal towns, and in large inland towns with good marketing facilities, than in the smaller towns and rural districts. The rural households surveyed in 1941 purchased an average of only 1.8 oz. of fish (other than canned fish) compared with 4.8 oz. for the urban sample, and the households surveyed in London and Great Yarmouth purchased more than twice as much as those in Reading. The records for fried fish show an average of 0.45 oz. in the rural as compared with 0.98 in the urban sample.

78. Purchases of canned fish among the households surveyed in 1940 averaged 1.4 to 1.5 oz. Although consumption increased after 1942, this level was not reached again during the war. Information about canned fish is not available from the pre-war surveys.

TABLE 24
Domestic Consumption of Fish 1942-1945

	<i>oz. per head per week</i>			
	1942	1943	1944	1945
Fresh, dried and smoked	4.94	4.46	5.25	6.71
Fried	1.04	1.21	1.22	1.51
Canned	0.63	0.87	1.15	0.99
Total	6.61	6.54	7.62	9.21

EGGS

79. The supply of eggs in shell available for civilian consumption was heavily reduced during the war, and in 1943 and 1944 amounted to less than half the pre-war supply. A scheme of controlled distribution was introduced in June 1941, under which priority was given to expectant and nursing mothers, infants and invalids. In 1943 expectant and nursing mothers were excluded from these priority classes, but expectant mothers were allowed one egg per allocation on their supplementary book, in addition to their normal entitlement. The non-priority consumers received allocations as supplies permitted, varying from about one egg a month in the winter to one or two a week during the spring season of maximum production.

80. The Ministry of Labour and Crawford and Broadley surveys agree in placing the average pre-war consumption of eggs in shell in working-class households at 3.6 to 3.7 per head per week. The Surveys made in 1940 showed average purchases of 2.68 eggs a week in July and 1.96 in October, and the average in 1941 was 1.40. Consumption by the surveyed households remained well below this level in the following years, until it recovered slightly in 1945. The Survey recorded the consumption of eggs produced by domestic poultry as well as those purchased. From 1943 to 1945 "free" eggs (almost all of which would be from poultry kept by the informants), represented approximately one-fifth to one-quarter of the total consumed.

81. Dried eggs were hardly consumed at all in the household before the war, but after 1942 they were imported in large quantities in order to economise in shipping space. The import of an equivalent quantity of shell eggs would have required about five times the tonnage used for the dried eggs and the import of the necessary feeding stuffs to produce this quantity of eggs at home would have been still more wasteful. The distribution of dried eggs to the public began in June 1942 on the basis of ration books, although retailers were allowed from time to time to sell without restriction to their registered customers. Children under five and expectant mothers received a double entitlement. By 1944 about two thirds of the total consumption of eggs in the households surveyed was in the form of dried eggs.

TABLE 25
Domestic Consumption of Eggs 1942-1945

No. of eggs or equivalent eggs per head per week

	1942	1943	1944	1945
Shell eggs	0.92	0.83	0.94	1.27
Dried eggs	0.48	1.39	1.99	1.74
Total	1.40	2.22	2.93	3.01
Non-priority allocation of shell eggs	0.56	0.58	0.58	0.90

FATS

82. Supplies of fats (butter, margarine and cooking fats) for civilian consumption were kept at a little below the pre-war level chiefly by offsetting the fall in imports with increased home production of margarine. In 1941, urban working-class purchases of 8.4 oz. per head per week were recorded and Table 26 shows that, with the exception of 1944, consumption remained at about this level for the rest of the war.

TABLE 26
Domestic Consumption of Fats 1942-1945

oz. per head per week

	1942	1943	1944	1945
BUTTER				
Consumption	1.98	2.00	2.05	2.16
Average level of ration ...	2.0	2.0	2.0	2.1
MARGARINE				
Consumption	4.15	4.18	4.29	4.19
Maximum ration	6.0	6.0	6.0	6.0
RATIONED COOKING FATS				
Consumption	1.78	1.95	1.98	1.51
Average level of ration ...	2.0	2.0	2.0	1.5
Total consumption (rationed fats)	7.91	8.13	8.32	7.86
Suet and dripping consumption	0.73	0.60	0.88	0.77
Total fats consumption	8.64	8.73	9.20	8.63
Purchases of suet and dripping ...	0.43	0.40	0.46	0.29

83. Pre-war working-class purchases of butter according to the Ministry of Labour Survey were 7·6 oz. per head per week. Rationing was introduced in January 1940 at 4 oz. but in July a combined ration of 6 oz. of butter and margarine was instituted of which not more than 2 oz. could be taken as butter except during certain periods when 4 oz. was allowed. The combined ration remained at 6 oz. for the remainder of the war except for short periods in the autumn and winter of 1941–1942 and in December 1944, when there were temporary increases in the ration of margarine. Butter purchases recorded in the Survey varied in 1940 between 2·7 and 2·0 oz. and averaged 2·3 oz. during 1941. From 1942, consumption was almost the same as the maximum butter ration.

84. Before the war margarine was chiefly consumed by the poorer families. The Ministry of Labour recorded a weekly purchase per head of 3 oz. as compared with the average of 5 oz. shown by the Carnegie Survey. In 1940. average margarine purchases by the Survey households varied between 3·6 and 3·9 oz. and during 1941 reached an average of 4·1 oz. Consumption subsequently remained a little above 4 oz. which broadly represented the combined ration less the maximum butter entitlement. Combined butter and margarine consumption during the war was therefore about 60 per cent of that recorded by the Ministry of Labour in 1937–1938.

85. The budgets collected by Orr gave just under 4 oz. for “lard, suet and dripping” and Crawford and Broadley’s estimate for “cooking fats” was just under 2·5 oz. No similar estimate is available from Ministry of Labour data. Lard and cooking fats were rationed in July 1940 at 2 oz. which the consumer could at first take as margarine if he wished. In the autumn the ration was raised to 3 oz. and the option withdrawn. Working-class purchases in 1941 were recorded as 1·98 oz. Early in 1942 the ration was again reduced to 2 oz. and it remained without further change, except for a Christmas bonus in 1944, until the reduction to 1 oz. in 1945.

86. Suet and dripping remained unrationed throughout the war, although in irregular supply, and the Survey estimates of consumption fluctuated between 1942 and 1945 about an average of roughly $\frac{3}{4}$ oz. per head per week. Some caution is necessary in interpreting this figure since it included a relatively large consumption from stocks, part of which probably represented dripping and rendered fat obtained by the housewife from meat or purchased fat bought before the commencement of the Survey. Consumption of such stocks tends in practice to be balanced by the replenishment from fat derived from the current week’s purchases of meat or other foods, so that there should not, on the average, be any large differences between the opening and closing stocks of home rendered fat. But for technical reasons it was necessary in the Survey¹ to record closing stocks of home-made foods in terms, not of the products themselves, but of their ingredients (in this instance, principally meat). As a result, there was a tendency to overestimate the consumption of foods such as cakes, pies, jam and dripping, of which part of the supply was home made, and to underestimate correspondingly the consumption of their ingredients. Usually the error thus caused was unimportant, since that part of consumption drawn from stocks is comparatively small. For suet and dripping this was not so; nearly half the consumption came from stocks, as is clear from the figures of of purchases given in Table 26, and the error may have been appreciable.

FRUIT

87. The importation of fresh and canned fruit, except for a small and intermittent supply of oranges, ceased after 1940. The home supply thus depended on the harvests, which were fortunately good but could not, with the

¹ See Appendix A paragraph 26.

exception of tomatoes, provide more than about two-thirds of the normal consumption. Imports of dried fruits, in view of their high calorie value and their importance in the making of cakes and puddings, were more favourably regarded and imports, except during 1940, remained at about the peacetime tonnage.

88. Apart from a loose scheme of control under which children and expectant mothers were given priority in the allocation of oranges, no form of rationing was attempted for fresh fruit during the war. The production of tomatoes received official encouragement and rapidly expanded and in the later years of the war, many kinds of fruit were subject to more or less complicated systems of price control under which efforts were made to secure even geographical distribution. For some soft fruits jam manufacturers had the right of pre-emption and only relatively small quantities remained available for purchase by the general public. After the introduction of the Points Scheme, dried fruits and the very limited supply of imported canned fruit were point rationed.

89. The only pre-war survey which attempted an estimate of the total consumption of fresh fruit among working-class households is that of Orr, who gives figures (stated to be subject to a wide margin of error) averaging 24 oz. per head per week. Estimates from supply statistics give an average consumption before the war for all classes of 27 oz. but this figure includes tomatoes and fresh fruit used for manufacture. The wartime surveys show purchases of fresh fruit and tomatoes amounting to 12 to 14 oz. in July and October 1940 and to about 8 oz. during the periods covered by the Survey in 1941. From 1942 to 1945 consumption among the surveyed households (Table 27) rose gradually from about 9.5 to nearly 14 oz. By that year consumption of apples had recovered to the level recorded in the Ministry of Labour Survey (5 oz.), but that of oranges, though nearly 10 times greater than in 1943, was still only half the quantity purchased in 1937-1938 when the Ministry of Labour recorded an average consumption of 1 orange or about 5.5 oz.

90. No survey estimates of canned fruit consumption before the war are available. The Crawford and Broadley Survey estimated pre-war working-class consumption of dried fruits at 1.5 oz. which is approximately equal to that shown by the Food Survey for 1944 and 1945.

TABLE 27
Domestic Consumption of Fruit 1942-1945

oz. per head per week

	1942	1943	1944	1945
Tomatoes	2.53	2.82	2.44	2.63
Oranges	0.58	0.27	1.19 (b)	2.64 (b)
Apples	} 6.36	} 7.62	4.75	5.21
Other fresh fruit (a)			3.29	3.35
Total fresh fruit	9.47	10.71	11.67	13.83
Canned and bottled fruit and tomatoes	1.31	0.84	0.71	0.60
Dried fruit	1.53	1.22	1.60	1.51
Total all fruit	12.31	12.77	13.98	15.94

(a) Includes rhubarb.

(b) Includes other citrus fruits.

VEGETABLES

91. The acreage under potatoes increased steadily up to 1944, by which year it was almost double that of 1939. With a series of good harvests, this expansion of acreage made possible a rise in potato consumption which reached a peak just before the severe winter of 1944 and 1945.

92. The pre-war working-class households purchased about 60 oz. of potatoes per head per week (Ministry of Labour Survey 58·5 oz. excluding chips ; and Crawford and Broadley's Survey 61·6 oz.). By 1941 the average weekly purchase, according to the Surveys was 66·7 oz. or 69·4 including chips. In 1944 (Table 28), consumption reached 69 oz. per head of fresh potatoes and more than 2 oz. of chips. The wartime increase in consumption thus appears to have been of the order of 15 per cent.

TABLE 28
Domestic Consumption of Potatoes 1942-1945

					<i>oz. per head per week</i>			
					1942	1943	1944	1945
Potatoes	...	...	...	...	66·20	68·59	68·98	65·73
Chips	...	...	...	...	2·26	2·58	2·36	2·77
Total	...	...	...	...	68·46	71·17	71·34	68·50

93. Table 29 shows that potatoes made a substantial contribution to the wartime diet. Although they provided less than 10 per cent of the total calorie intake by urban working-class households, they were a source of vitamin C throughout the year and supplied on the average 40 to 50 per cent of this nutrient, together with significant quantities of vitamin B₁ and of nicotinic acid. The fat shown in Table 29 is accounted for by chips.

TABLE 29
Proportions of total Energy Value and Nutrients derived from Potatoes (including chips) in Domestic Consumption 1942-1945

					1942	1943	1944	1945
					%	%	%	%
Energy value (calories)	...	...	...	...	7·1	8·3	7·8	7·7
Protein	...	...	...	...	6·8	6·5	6·2	5·8
Fat	...	...	...	...	(a)	1·1	0·9	1·1
Calcium	...	...	...	...	2·8	2·5	2·4	2·3
Iron	...	...	...	...	14·1	10·3	10·0	10·5
Vitamin B ₁	...	...	...	...	19·3	20·0	17·9	19·1
Riboflavin	...	...	...	...	9·9	9·6	8·9	9·4
Nicotinic acid	...	...	...	...	16·4	19·2	17·1	17·3
Vitamin C	...	...	...	...	40·8	45·8	41·3	41·9

(a) Not available.

94. Acreage under vegetables other than potatoes also expanded during the war and the increase in the consumption of these vegetables is indicated by the comparison between Orr's rough estimate, based on expenditure, of 26 oz. and the results of the Survey (Table 30) in the latter years of the war which showed

a consumption of over 35 oz. per head per week. The increase in consumption from 1942 to 1945 recorded by the Survey is attributable first to fresh green vegetables and second to canned and dried vegetables.

95. Consumption of canned vegetables was restricted by the fall in imports and during the years 1942 to 1944 was about 1·8 oz. In 1945, with the resumption of imports, a level of 2·8 oz. was reached.

TABLE 30
Domestic Consumption of Vegetables other than Potatoes 1942-1945

oz. per head per week

	1942	1943	1944	1945
Fresh green	11·91	15·11	16·07	14·67
Fresh peas and beans	3·54	3·97	3·94	3·85
Carrots	3·85	3·79	3·84	3·93
Turnips, swedes, other root vegetables and miscellaneous vegetables including onions and shallots	9·50	8·85	10·56	10·02
Canned and dried	2·55	2·75	2·90	3·85
Total	31·35	34·47	37·31	36·32

96. Consumption of the main groups of vegetables is shown by season in Table 31. The Survey results for 1942 exclude almost the whole of January and February, and refer to five periods during the rest of the year. These figures are not included in the Table. It should also be noted that almost the whole of January is excluded from the figure for 1943 and that this omission, with so strongly seasonal a commodity, affects the comparability of the figures for the first quarter and to some extent that of the annual averages.

TABLE 31
Domestic Consumption of Fresh Vegetables by Season 1943-1945

oz. per head per week

	Root vegetables			Green vegetables			Fresh beans and peas		
	1943 (a)	1944	1945	1943	1944	1945	1943	1944	1945
First quarter	12·69	15·00	14·30	16·36	15·12	13·99	—	—	—
Second quarter	4·85	5·22	5·36	18·16	19·29	16·64	1·72	1·12	1·42
Third quarter	6·04	8·89	10·11	10·17	13·05	12·15	12·02	13·65	13·14
Fourth quarter	10·88	16·42	15·32	16·32	16·81	15·88	0·78	0·90	0·82

(a) Excluding spanish onions and shallots.

GARDEN AND ALLOTMENT PRODUCE

97. Supplies of fruit and vegetables from gardens and allotments provided an important part of the total consumption of these commodities in the households surveyed. In the surveys between 28th April 1941 and 10th April 1942, the proportion of urban households obtaining vegetables from garden or allotment ranged seasonally from 12 per cent in the winter period (20th January to 4th March 1942) up to as much as 49 per cent in the summer (29th July to 6th September 1941). Among the rural households, the proportion was very much higher : 92 to 98 per cent in each of the last three survey periods of 1941.

98. Among the urban households obtaining garden or allotment supplies, the average weekly quantity obtained per household during these particular survey periods is given in Table 32. Annual averages are not applicable since by including those households obtaining produce at certain seasons only, they would be misleading.

TABLE 32
Supplies of Vegetables obtained from Gardens and Allotments 1941
and 1942

per household per week

		Potatoes		All other vegetables (a)	
		lb.	oz.	lb.	oz.
1941	April 28–June 26	4	6·5	1	15·6
	July 28–Sept. 6	3	7·5	4	0·2
	Oct. 27–Dec. 6	6	8·8	4	9·8
1942	Jan. 26–March 4	5	6·3	4	2·4
	Feb. 26–April 10	4	7·6	3	5·0

(a) Excluding rhubarb and tomatoes.

99. A comparison in 1941 between households with and without gardens and allotments proved that both in the summer (June) and in the winter (October to December) households with gardens or allotments obtained larger quantities of fresh vegetables other than potatoes compared with households relying on purchases alone. These results are consistent with the view that possession of a garden or allotment tends to encourage the consumption of vegetables, but it should be remembered that possession of a garden, particularly in urban areas, is in itself a mark of relatively high economic status, and that households of higher economic status tend to consume relatively large quantities of most vegetables except potatoes, whether they have gardens or not.

100. Lastly, Table 33 shows by value the proportion of free supplies to total supplies of fresh vegetables (including potatoes) and fruit obtained by all households during the years 1943 to 1945. Free potatoes, which are those chiefly from the garden or allotment, are seen to have provided a substantial contribution to the diet during the third quarter of each year. In 1943 the proportion was almost 12 per cent by value, but from that year until 1945 it fell by more than one-half. By 1945 free potatoes during the third quarter accounted for about 5 per cent of the total.

101. As compared with potatoes, free supplies of other fresh vegetables, together with fresh fruits, provided a larger share of the total by value and the Table suggests that gardens and allotments were important sources of these foods throughout the whole year. In no quarter during 1943 and 1944 did they contribute less than about one-tenth of the total value and in the third quarters of these years the proportions were a quarter and a fifth. But by 1945 supplies from this source were declining steadily, from 19 per cent for the year 1943 to 14 per cent in 1944 and to 10 per cent in 1945. Their importance in the mid-war years can also be expressed as the value during the quarter when their contribution was greatest. They amounted to a value of 6d. per head of all persons in the sample during the peak quarter of 1943 but only 3d. during the same quarter in 1945. Only a proportion of the households obtained these free foods and for the persons in these households the average value at each date was naturally much higher.

TABLE 33
Value of Free Fruit and Fresh Vegetables consumed by Urban Working-Class Households 1943-1945

Expressed as percentage (a) of value of all such produce

	Potatoes (b)			Other fresh vegetables and fresh fruit		
	1943	1944	1945	1943	1944	1945
First quarter	0.5	0	0	12.0	9.0	3.0
Second quarter	2.5	0.5	0.5	16.0	11.5	7.5
Third quarter	11.5	8.5	5.0	25.0	19.5	15.0
Fourth quarter	1.0	1.0	0.5	15.0	11.5	10.0
Annual average ...	4.0	2.5	1.5	19.0	14.0	10.0

(a) Percentages are given to the nearest half per cent.

(b) Percentages are calculated as proportions of all potatoes, including chips.

CEREAL FOODS

102. It was a fundamental part of the wartime food policy to ensure that sufficient bread was available to compensate for shortages in the diet and to achieve this without recourse to rationing. These two objectives were successfully realised throughout the war years; it is estimated that total supplies of flour per head moving into civilian consumption had risen by more than 20 per cent in 1941 compared with before the war. This increase was possible, although imports fell, by expanding the acreage under wheat in this country and by raising the extraction rate. For a short period in the autumn of 1942 barley and oats were added as diluents to the flour, but the wartime loaf was never so heavily diluted as in 1918.

103. By 1941, working-class purchases of *bread* were about 62 oz. (Table 34), compared with 57.3 oz. and 56.4 oz. recorded by the Ministry of Labour and by Crawford and Broadley, an increase of about 9 per cent. For this comparison it is necessary to make an adjustment in the wartime results for any varying representation in the sample of localities such as Yorkshire, Durham and Northumberland, where bread is frequently baked in the home. The proportion of households from home-baking towns remained fairly constant from 1942 to 1945 at about 12 per cent, but in 1941 it was about 18 per cent. Table 34 has been adjusted accordingly.

104. During 1941 and the period from 28th January to 4th March, 1942 brown and National Wheatmeal bread (which was on sale from March, though not in general use until April 1942) represented about 8 per cent of the total purchases of bread by the households surveyed. After the consumption of National Wheatmeal bread became general in 1942, the proportion of the total represented by brown bread other than National Wheatmeal bread fell to between 3 and 4 per cent. Brown bread was rarely, if ever, baked at home, even in the towns where home-baking was customary.

105. The increase in bread purchases which took place during the early years of the war was accompanied by a decline in *flour* purchases by the housewife. The Ministry of Labour and Crawford and Broadley recorded flour purchases of 18.7 oz. and 13.4 oz.; in the July and October Surveys, 1940, an average of 11 oz. was recorded and the average fell eventually to 6 or 7 oz. during the final years of the war. The use of flour seems to have declined even while white flour was still obtainable, probably because the increase in the number of housewives in full or part-time employment and the shortage of fats and sugar gave a decided check to the home baking of bread, cakes and pastry. This

decline was presumably encouraged when flour lost its white appearance, particularly following the extraction rate increase in 1942.¹ The consumption of bread itself is seen from Table 34 to have declined slightly after 1941, but the improvement in the variety of the diet after that year was a contributory cause of this. In 1945 both the extraction rate was decreased and the variety in the diet was reduced ; it is seen that bread consumption again rose.

TABLE 34
Domestic Consumption of Bread, Flour and other Cereal Foods 1941-1945

oz. per head per week

	1941 (d)	1941 (d) (adjusted average) (e)	1942	1943	1944	1945
Bread (a)	60.5	62.1	60.6	59.7	59.9	61.8
Flour	12.9	10.7	6.4	6.9	7.1	6.2
Biscuits (b)	2.5	—	2.6	1.8	2.0	2.9
Cakes, buns and scones ...	6.3	—	7.0	8.4	9.6	10.4
Oatmeal and oat products	1.3	—	1.7	1.3	1.4	1.3
Breakfast cereals	0.7	—	0.8	0.8	0.9	0.9
Other cereal foods (c) ...	2.1	—	2.4	2.4	2.4	2.0

(a) Includes rolls, breadcrumbs, currant and malt bread, small quantities of brown flour (1941 and 1942) and rusks and crisp bread (1941 only).

(b) From 1942 also includes rusks and crisp bread.

(c) Include rice, sago, tapioca, cornflour, custard powder.

(d) Purchases.

(e) See paragraph 103.

106. The decline in flour consumption in the home, although general throughout the country was particularly evident in those areas where it had been usual to bake bread frequently in the home. Inquiries were made from time to time into the frequency of home bread-making among households taking part in the survey and the results are summarised in Table 35. During the first of the periods (26th January to 4th March 1942) the whiter flour of 75 per cent extraction was freely available, but by the commencement of the second period, in June 1942, it could no longer be obtained.

TABLE 35
Number and Proportion of Households baking Bread 1942 and 1944

Proportion of bread baked in the home	1942								1944			
	Jan. 26-Mar. 4				June 11-Aug. 22				May and November			
	Home-baking Areas (a)		Other Areas		Home-baking Areas (a)		Other Areas		Home-baking Areas (b)		Other Areas	
	No. of Households	%	No. of Households	%	No. of Households	%	No. of Households	%	No. of Households	%	No. of Households	%
All ...	32	20	1	...	28	9	6	...	20	10	5	...
Part ...	54	33	3	...	40	13	15	1	50	24	14	1
None ...	77	47	859	99	245	78	2,047	99	136	66	1,223	99
	163	100	863	100	313	100	2,068	100	206	100	1,242	100

... Less than 0.5 per cent.

(a) Hull, Leeds and Newcastle-upon-Tyne.

(b) Leeds, Bradford, Newcastle-upon-Tyne, Sheffield and Darlington.

¹ See paragraph 107 below.

107. Table 36 illustrates further the decline in flour usage in the home during the years 1941 to 1943; the comparison is still tenable although the 1941 figures refer to purchases and not to consumption. It shows that this decline was not wholly attributable to the change from home-baked bread to purchased bread. From the time (March, April 1942) that the milling of white flour and the sale of white bread were prohibited, the consumption of flour by households in the Sample progressively declined in the home-baking towns and that of purchased bread continuously increased; but the decline in the consumption of flour was considerably more than the equivalent of the increased consumption of purchased bread, which suggests that the quantities used for purposes other than bread making were also reduced. This general decline throughout the country in the use of flour in the home was one of the more important changes in consumption habits during the war.

TABLE 36
Domestic Consumption of Bread and Flour in Home-baking and Other Towns

oz. per head per week

				Home-baking towns (a)		Other towns	
				Bread (b)	Flour	Bread (b)	Flour
1941	Average of survey periods	...	...	31.7 (c)	39.0 (c)	67.2 (c)	6.8 (c)
1942	February 26th–April 10th	...	...	43.8	23.0	62.6	6.1
1943	January 28th–April 3rd	...	...	46.3	15.9	61.2	5.9
	March 29th–July 3rd	...	...	50.7	14.9	61.3	5.7

(a) In 1941, Sheffield and Bishop Auckland; in 1942 and 1943, Hull, Leeds and Newcastle-upon-Tyne.

(b) For definition see note (a) to Table 34.

(c) Purchases.

108. Apart from the causes already mentioned, one further change which may have been partly responsible for the decline in home baking of bread and other flour products from the later months of 1941, was the revision in the prices of bread and flour which came into effect in October 1941 as the result of a decision to replace part of the subsidy hitherto paid on flour by a direct subsidy on bread. The price of flour was slightly increased on the average and the price of bread slightly reduced, but the alteration in prices was relatively greater in the home-baking areas than elsewhere, flour having previously been cheaper and bread somewhat dearer in these areas than in the rest of the country. From the 1941 Survey results, it appears that in Sheffield and Bishop Auckland the average price paid for flour rose by about 25 per cent, and that paid for bread decreased by about 10 per cent, but that in the other areas surveyed the changes were small.

109. The importance of bread in the wartime diet is not measured only by the increase in the quantity consumed, for its nutritional value was also improved when the extraction rate was raised and calcium carbonate was added to flour. Before the war, the extraction rate was about 70 per cent. During 1941 and 1942 the shortage of wheat necessitated successive rises in the extraction rate to 75 per cent in April 1941 and to 85 per cent in March 1942. Subsequently,

improvement in the supply position in 1944 permitted a decrease in the rate to 82½ per cent in October and to 80 per cent in December. Flour was fortified with calcium carbonate from August 1943 onwards by adding 7 oz. to a 280 lb. sack. The effect of these changes is seen in the following table.

TABLE 37
Proportions of total Energy Value and Nutrients derived from Bread and Flour in Domestic Consumption 1942-1945

	1942	1943	1944	1945
	%	%	%	%
Energy value (calories)	31·5	31·0	29·8	30·4
Protein... ..	35·1	33·5	31·5	32·9
Fat	(a)	3·5	3·4	3·5
Calcium	5·9	20·3	19·9	20·0
Iron	32·6	36·1	32·6	29·9
Vitamin B ₁	37·9	40·0	37·7	35·4
Riboflavin	15·6	17·1	14·8	10·1
Nicotinic acid	26·9	26·8	26·6	26·5

(a) Not available.

SUGAR AND PRESERVES

110. Sugar was among the earliest commodities rationed during the war, the fall in imports reducing the quantity available for direct consumption and manufacture to between 65 and 70 per cent of pre-war supplies, although the position improved slightly in 1944 and 1945. The amount of the ration was 12 oz. from January to May 1940, but except for a brief return to 12 oz. in the winter of 1941 and 1942 it remained at 8 oz. for the rest of the period. Additional allowances were made from time to time, mainly in the fruit preserving season, and sugar could also be taken at certain times from March 1942 onwards in lieu of preserves (or preserves in lieu of sugar) at rates of exchange which alternated between one pound and one-half pound of sugar for one pound of preserves.

111. For preserves, a loose form of rationing known as the "minimum share" scheme operated from March to July 1941, under which the retailer was expected to provide a minimum share of 8 oz. per head per week, but from July 1941 onwards the usual rationing arrangements were applied to preserves at the flat rate of one pound per head per four weeks. The ration remained at this level for the rest of the period, except for an increase to two pounds per four weeks in May to August 1944, and for temporary extra allowances of certain kinds of preserves in 1943 and 1945. Mincemeat (from October 1941) and fruit curd and imported and imitation honey (from April 1942) were included in the preserves ration, but syrup and treacle were transferred to the points rationing scheme in June 1942 and imported canned marmalade in March 1944.

112. Working-class consumption of sugar before the war was estimated by Crawford and Broadley at 16·5 oz. per head per week and by Orr at just under 17 oz. The Ministry of Labour Survey gave the higher average of 20·4 oz. The 1940 surveys recorded a weekly purchase of 10·6 oz. in July (when a sugar bonus was issued) and 7·9 oz. in October. During 1941 the average purchase was 8·6 oz. In the later years of the war as is shown in Table 38, estimated consumption by the households surveyed rose to a little over 9 oz.

TABLE 38
Domestic Consumption of Sugar and Preserves 1942-1945

oz. per head per week

	1942	1943	1944	1945
SUGAR				
Consumption	8.41	8.71	9.05	9.13
Average level of ration plus bonuses ...	8.3	8.0	8.5	8.6
Maximum preserves option	0.9	3.1	4.0	4.0
PRESERVES (a)				
Consumption	4.93	5.19	6.05	5.48
Purchases	3.57	4.54	4.81	4.28
Average level of ration (b)	4.0	4.9	5.2	5.8 (c)

(a) Jam, marmalade, syrup, treacle, mincemeat, fruit curd and honey.

(b) Excluding preserves on points.

(c) If 2 lb. marmalade taken in lieu of 1 lb. jam.

113. Pre-war purchases of jam and marmalade were recorded by the Ministry of Labour Survey at an average of 4.2 oz. per head per week and the Crawford and Broadley Survey gave 5.6 oz. for jam and marmalade together with syrup. In addition, there were substantial quantities of home-made jam and marmalade which, with the introduction of sugar rationing during the war, necessarily declined. The wartime Survey, which grouped mincemeat and other types of sweet spread with jam and marmalade showed an average purchase of 4.2 oz. in July and 3.3 oz. in October 1940, and an average of 4.0 oz. in 1941. In the later years, consumption increased and may have risen to about pre-war level.

Energy Value and Nutrient Composition of the Diet 1942 to 1945

114. The arrangements for the rationing and distribution of food during the war took into account the considerable advances in nutritional science which had occurred in the inter-war period, so that it was possible to pay much more attention to the physiological needs of the population than during the first world war. An equitable distribution of the major foods in short supply, such as meat, bacon, cheese, fats and sugar, was considered important on nutritional as well as on other grounds. Special needs were recognised in the distribution of liquid and dried milk and of other valuable foods, and the fortification of margarine with vitamins A and D was wholly justified by the shortage of butter and other sources of these nutrients. The use of a higher extraction flour was not only a measure of economy; it also provided more iron and B vitamins and the possibility that this flour, with its higher content of phytic acid, might have an adverse effect on the availability of the calcium in the diet was the reason why flour was fortified with calcium carbonate.

115. Some of these schemes were introduced almost immediately; others at a later date.¹ Their influence on the nutritive value of the urban working-class diet is considered in the tables which follow. The data are presented in two sets of tables which show

- (a) the value, expressed as absolute quantities and as percentages, in calories and nutrients of different groups of food consumed in the home or taken from the home in packed meals;
- (b) the proportion of calories and nutrients derived from rationed and unrationed foods.

¹ See paragraphs 22 *et seq.* above.

116. Budgetary data are not available for comparison with the pre-war years, so that reference is made to the estimates supplied by the various reports on "Food Consumption Levels".¹ Otherwise the tables refer to the data obtained from the National Food Survey and deal with the nutrient equivalents of food purchased during survey week adjusted for changes in larder stocks. The contribution of vitamin welfare foods is not included but welfare milk, *including milk drunk at school*, has been taken into consideration. As distinct from other welfare foods milk is a food in general consumption and the contribution of school milk, which could be ascertained without difficulty, makes possible a complete account of this important food with the exception of the small quantities consumed in catering establishments.

117. The nutrient equivalents have been based in the main on the values published in "Nutritive Values of Wartime Foods, Medical Research Council War Memorandum No. 14," but the nutrient composition of bread and flour was obtained separately by analysis of grists at the Cereals Research Station of the British Flour Millers Research Association at St. Albans, and the values for made-up dishes were assessed by tests made in the Ministry of Food's experimental kitchens.² The computations make an average allowance for losses of such inedible material as potato peel or meat bones, but do not include any allowance for the losses of edible material or nutrients during cooking or by "plate waste", except that in some of the tables which follow allowances have been made for losses of vitamin C estimated to have occurred during cooking. These estimates are discussed below.

ENERGY VALUE

118. The importance of a food supply adequate in energy value cannot be over-stressed; a grossly inadequate supply means starvation and even a moderate insufficiency leads to depression, irritability and apathy, conditions of mind which would have had serious consequences for a population in time of war.

119. It is not possible from National Food Survey data to measure the immediate effect of the war on the energy value of the diet since comparable pre-war data are not available, but estimates derived from total civilian food supplies³ give the following picture. By 1940 the total energy value of food available for consumption had fallen to 93 per cent of the pre-war level. It remained at about this level during the years 1941 to 1943, regained the pre-war figure in 1944, and fell again to 98 per cent in 1945. That total supplies of calories provided by the diet kept within 5 per cent of the pre-war total during 1942 and 1943, and regained the pre-war total in 1944, was due to the ample provision of the "buffer" foods, flour and bread and potatoes. These were unrationed throughout the period under review and were comparatively cheap.

120. Values of particular foods moving into general civilian consumption were published in Tables 28-35 of "Food Consumption Levels in the United States, Canada and the United Kingdom, 1946," and from these the change in the general pattern of the diet can be examined (Table 39). The changes most likely to decrease the palatability of the diet took place during 1940 and 1941. By 1941, the proportion of total calories contributed by meat and fish had fallen from 18 per cent to 14.5 per cent, to remain at this level, except for a rise to 15.8 in 1944, until the end of the war; that of sugars and syrups from 15.5 per cent to 11 per cent where it remained until the end of the war; and that of grain products had risen from 30 per cent to its highest wartime level of 39 per cent, from which it subsequently fell to 36 to 37 per cent.

¹ See paragraph 43 above.

² Other departures from War Memorandum No. 14 also affected certain vitamins. Details are given in paragraph 140 below and footnote (3) paragraph 145.

³ Cmd. 7842. See footnote (1) paragraph 63.

121. The year 1942 brought an improvement in supplies of dairy produce which, from this year until the end of the war, provided 11 per cent of total calories. During the period of the table, the proportion of total calories from fats and oils fell from 17 per cent before the war to 14 per cent in 1945, while that from potatoes rose from 4 per cent to 6.5 per cent. Other changes, though important in other respects, had little effect on the calorie pattern of the diet.

TABLE 39
Energy Value of Supplies of Foods moving into Civilian Consumption
1940-1945 (a) compared with before the War

As percentages

	Pre-war	1940	1941	1942	1943	1944	1945
Dairy products	9.0	9.3	9.5	11.2	11.3	10.7	11.0
Meats	16.6	15.8	13.5	13.7	13.3	14.7	13.1
Poultry, game and fish	1.5	1.3	1.0	1.0	1.0	1.1	1.3
Eggs and egg products	1.4	1.4	1.2	1.2	1.3	1.2	1.4
Fats and oils	16.9	16.5	15.9	15.5	14.9	14.6	14.1
Sugar and syrups	15.5	12.1	10.9	10.9	11.0	11.1	11.0
Potatoes	4.2	4.2	4.7	5.6	6.2	6.5	6.3
Pulses and nuts	1.4	1.2	1.1	0.9	0.9	0.9	0.9
Tomatoes and citrus fruits	0.4	0.3	0.1	0.2	0.1	0.2	0.3
Other fruit	1.7	1.4	1.0	1.3	1.1	1.2	1.1
Leafy, green and yellow vegetables	0.5	0.6	0.7	0.7	0.7	0.7	0.7
Other vegetables	0.3	0.2	0.2	0.2	0.2	0.3	0.3
Grain products	29.8	34.4	39.0	36.6	37.3	36.0	37.6
Beverages	0.8	1.3	1.2	1.0	0.7	0.8	0.9
	100.0	100.0	100.0	100.0	100.0	100.0	100.0

(a) Based on "Food Consumption Levels in the United Kingdom," Cmd. 7842 as revised 1950.

122. The estimated calorie value of working-class domestic food consumption is given in Table 7 where it is seen to have been 2,398 per person per day in July and 2,311 in October 1940, and 2,335 in 1941. The figures in Table 40 show

TABLE 40
Energy Value of Domestic Food Consumption 1942-1945

Cal. per head per day

	1942		1943		1944		1945	
		% of total		% of total		% of total		% of total
Bread and flour	714	31.5	706	31.0	712	29.8	721	30.4
Other cereal products ...	219	9.6	209	9.2	228	9.6	247	10.4
		—41.1		—40.2		—39.4		—40.8
Fats	279	12.3	283	12.5	298	12.5	280	11.8
Sugars and preserves ...	181	8.0	188	8.3	203	8.5	197	8.3
Meat, rationed (incl. bacon) ...	229	10.1	208	9.2	239	10.0	221	9.3
Meat other	93	4.1	72	3.2	86	3.6	75	3.2
		—14.2		—12.4		—13.6		—12.5
Potatoes incl. chips	161	7.1	189	8.3	187	7.8	184	7.7
Other vegetables and fruit ...	58	2.5	59	2.6	67	2.8	71	3.0
		—9.6		—10.9		—10.6		—10.7
Milk	201	8.9	219	9.6	222	9.3	226	9.5
Other foods	134	5.9	139	6.1	145	6.1	153	6.4
Total	2,269	100.0	2,272	100.0	2,387	100.0	2,375	100.0

the same improvement by 1944 as the picture of the general supply position given above. Between 1942 and 1945, bread, flour and other cereals provided approximately 40 per cent of the total calories of the working-class domestic diet. The contribution from fats was steady at about 12 per cent of the total and that from sugar and preserves at just over 8 per cent. In contrast, the proportion of total calories from meats fell from just over 14 per cent to 12.5 per cent and that from milk rose from under 9 per cent to above 9.5 per cent.

123. Comparison of the number of calories in the working-class diet derived from rationed and unrationed foods during the years 1942 to 1945 is given in Table 41. During this period bread and potatoes were unrationed so that less than half of the energy intake was derived from rationed foods. The contribution of calories from points rationed foods was largest in 1943 but even then did not reach 9 per cent of the total.

TABLE 41
Energy Value derived from Rationed and Unrationed Foods 1942-1945

Cal. per head per day

	1942	1943	1944	1945
RATIONED FOODS				
By weight or value ...	734	676	739	694
Points foods ...	83	198	155	173
Milk and eggs ...	211	232	244	249
	—1,028	—1,106	—1,138	—1,116
UNRATIONED FOODS ...	1,241	1,166	1,249	1,259
Total ...	2,269	2,272	2,387	2,375

PROTEIN

124. It was accepted early in the war that the total protein supply was of more importance than the proportion of animal to vegetable protein, but it was recognised that animal protein increases the palatability and acceptability of the diet. Total protein and protein obtained from animal sources are shown separately throughout this report.

125. According to estimates of consumption based on supplies, the supply of animal protein fell to 90 per cent of the pre-war level in 1940 and to 84 per cent in 1941. But by 1941 the increased consumption of bread and potatoes was having its effect and from that year onwards the supply of *total* protein exceeded the pre-war level.

126. The data for 1940 and 1941 in Table 7¹ illustrate these changes, in particular the uniquely low levels of animal protein, 28 and 30 g. per head daily, recorded for urban working-class households in the second and third quarters of 1941. Table 42 shows the picture after 1941. Total animal protein increased slightly from 1942 to 1945. During these years the contribution from milk and eggs increased, that from fish and meat remained constant, and that from cheese fell. Bread, flour and other cereals accounted for nearly 40 per cent of the total protein.

¹ See Table 8.

TABLE 42
Protein Content of Domestic Food Consumption 1942-1945

g. per head per day

	1942		1943		1944		1945	
		% of total		% of total		% of total		% of total
ANIMAL PROTEIN								
Milk	11	14.9	12	16.4	12	16.4	12	15.8
Cheese	4	5.4	3	4.1	3	4.1	2	2.6
		—20.3		—20.5		—20.5		—18.4
Meats	14	18.9	14	19.2	14	19.2	14	18.4
Fish	4	5.4	3	4.1	4	5.5	4	5.3
Eggs	1	1.4	2	2.7	2	2.7	3	3.9
Total animal protein	34	46.0	34	46.5	35	47.9	35	46.0
VEGETABLE PROTEIN								
Bread and flour ...	26	35.1	24	33.5	23	31.5	25	32.9
Other cereal products	4	5.4	5	6.3	5	6.9	6	7.9
		—40.5		—39.8		—38.4		—40.8
Potatoes and vegetables	8	10.8	8	11.0	8	11.0	8	10.6
Other foods	2	2.7	2	2.7	2	2.7	2	2.6
Total vegetable protein	40	54.0	39	53.5	38	52.1	41	54.0
Total protein	74	100.0	73	100.0	73	100.0	76	100.0

127. All the major animal protein foods, except fish, were rationed or subject to some form of controlled distribution. Unrationed foods (Table 43) provided about 60 per cent of the total protein of the diet during the whole of the period under review.

TABLE 43
Protein derived from Rationed and Unrationed Foods 1942-1945

g. per head per day

	1942	1943	1944	1945
RATIONED FOODS				
By weight or value	13	13	12	12
Points foods	3	5	6	5
Milk and eggs	12	14	14	15
	—28	—32	—32	—32
UNRATIONED FOODS	46	41	41	44
Total	74	73	73	76

FAT

128. Total fat supplies for civilian consumption fell steeply during the first two years of the war, and remained well below the pre-war level from 1942 to 1945 when they stood at 89 per cent of the pre-war level. Of particular foods important in supplying fat, butter, margarine and cooking fats, as a group, suffered the largest contraction. Supply fell to 91 per cent of the pre-war level in 1940 and by 1945 had declined to as low as 82 per cent. The need for fat as a nutrient may be disputed but it possesses undoubted value in providing palatability in the diet and in being the most concentrated form of energy-giving food. The fall in supplies during the war decreased the palatability of the national diet and also made necessary an increase in the bulk of the diet if its energy value was to be maintained.

129. The fat content of urban working-class diets for the years 1940 to 1942 has not been calculated but for the years 1943 to 1945 the results are shown in Table 44. The total amount in the diet was higher during 1944 and 1945 than during 1943, a fact which reflects roughly the improvement in total supplies.

TABLE 44
Fat Content of Domestic Food Consumption 1943-1945

g. per head per day

	1943 (b)		1944		1945	
		% of total		% of total		% of total
Fats (a)	31	31.6	33	35.1	31	33.7
Meats	24	27.9	28	29.8	26	28.2
Milk and other dairy produce	18	20.9	18	19.2	18	19.6
Other foods	13	15.1	15	15.9	17	18.5
Total	86	100.0	94	100.0	92	100.0

(a) Butter, margarine, cooking fats and edible oils.

(b) Information for 1942 not available.

130. Table 45 shows that over 80 per cent of the total fat in the diet in 1943 and just under 80 per cent in 1944 and 1945 came from rationed foods.

TABLE 45
Fat derived from Rationed and Unrationed Foods 1943-1945

g. per head per day

	1943 (a)	1944	1945
RATIONED FOODS			
By weight or value	54	55	52
Points Foods	4	5	6
Milk and eggs	13	14	15
	-71	-74	-73
UNRATIONED FOODS	15	20	19
Total	86	94	92

(a) Information for 1942 not available.

CALCIUM

131. Before the war it was held that large sections of the population obtained insufficient supplies of calcium and the Advisory Committee on Nutrition recommended doubling milk supplies in order to remedy this.¹ As a result of the wartime measures, milk consumption steadily expanded. Calcium from cheese naturally declined with reduced cheese consumption but that from eggs and vegetables showed a small increase, and further calcium was also made available when flour was fortified soon after the extraction rate was raised. Together, the effect of these changes was estimated² to restore calcium supplies to their pre-war level in 1941, after some decline at first, and to ensure a steady increase above that level during the remaining war years.

132. Domestic working-class consumption for the years 1942 to 1945 is shown in Table 46. The amount of calcium from bread and other cereals rose from under 10 per cent in 1942 to nearly 25 per cent in 1943 to 1945, representing about half that supplied by milk.

¹ *First Report of the Advisory Committee on Nutrition, 1937, pages 12 and 13.*

² *Cmd. 7842.*

TABLE 46
Calcium Content of Domestic Food Consumption 1942-1945

mg. per head per day

	1942		1943		1944		1945	
		% of total		% of total		% of total		% of total
Milk	380	56.6	416	48.7	428	49.3	430	49.1
Cheese	109	16.2	101	11.8	85	9.8	81	9.3
		—72.8		—60.5		—59.1		—58.4
Vegetables ...	63	9.4	69	8.1	75	8.6	73	8.3
Bread and flour ...	40	5.9	174	20.3	173	19.9	175	20.0
Other cereal products ...	22	3.3	36	4.2	38	4.4	41	4.7
		—9.2		—24.5		—24.3		—24.7
Eggs	6	0.9	9	1.1	12	1.4	12	1.4
Other foods ...	52	7.7	50	5.8	57	6.6	63	7.2
Total	672	100.0	855	100.0	868	100.0	875	100.0

133. Table 47 shows that two-thirds of the calcium in the working-class diet was derived from rationed foods, chiefly milk and cheese.

TABLE 47
Calcium derived from Rationed and Unrationed Foods 1943-1945

mg. per head per day

	1943 (a)	1944	1945
RATIONED FOODS			
By weight or value	111	95	92
Points foods	45	43	51
Milk and eggs	414	430	430
	—570	—568	—573
UNRATIONED FOODS	285	300	302
Total	855	868	875

(a) Information for 1942 not available.

IRON

134. Table 48 records the consumption of iron by urban working-class households, and the figures illustrate the effect of the changed composition of flour with the rise in the extraction rate. As was shown in Table 7¹ iron consumption for 1940 and 1941 lay between 12 and 13 mg.; in 1942 to 1944 it was above 13 mg. This increase may have been of importance in the prevention of anæmia.² The total intake of iron fell in 1945; there was a slight decrease in the iron from nearly all sources other than eggs, but the reduction of the extraction rate of flour to 80 per cent was the principal cause of this fall.

¹ See Table 8.

² Medical Research Council. Special Report Series No. 252.

TABLE 48
Iron Content of Domestic Food Consumption 1942-1945

mg. per head per day

	1942		1943		1944		1945	
		% of total		% of total		% of total		% of total
Bread and flour ...	4.4	32.6	4.8	36.1	4.4	32.6	3.8	29.9
Other cereal products ...	1.0	7.4	1.1	8.3	1.5	11.1	1.3	10.2
		—40.0		—44.4		—43.7		—40.1
Meat, rationed (including bacon)	2.0	14.8	1.7	12.8	1.7	12.6	1.9	15.0
Meat, other ...	1.2	8.9	1.0	7.5	1.0	7.4	0.8	6.3
		—23.7		—20.3		—20.0		—21.3
Vegetables ...	2.8	20.8	2.5	18.8	2.6	19.3	2.5	19.7
Eggs ...	0.3	2.2	0.5	3.7	0.6	4.4	0.6	4.7
Other foods ...	1.8	13.3	1.7	12.8	1.7	12.6	1.8	14.2
Total ...	13.5	100.0	13.3	100.0	13.5	100.0	12.7	100.0

135. Bread, flour and vegetables being the chief sources of iron, only about one-third of the iron in the working-class diet was derived from rationed foods (Table 49). Points rationed foods supplied between 11 per cent and 12 per cent of the total iron and were thus a more important source of this nutrient than of most others.

TABLE 49
Iron derived from Rationed and Unrationed Foods 1943-1945

mg. per head per day

	1943 (a)	1944	1945
RATIONED FOODS			
By weight or value ...	1.8	1.8	2.0
Points foods ...	1.5	1.5	1.5
Milk and eggs ...	0.9	1.0	1.0
	—4.2	—4.3	—4.5
UNRATIONED FOOD	9.1	9.2	8.2
Total ...	13.3	13.5	12.7

(a) Information for 1942 not available.

VITAMINS

136. The following tables do not take account of the special vitamin products which were issued as part of the Government's food policy. Imports of fresh fruit having been drastically curtailed in order to save shipping space and vegetables not being a satisfactory substitute as a source of vitamin C for the very young child, it was decided to make special vitamin supplements available to expectant mothers and very young children. Also in a climate lacking in adequate sunshine this section of the population required a guaranteed supply of vitamin D.

137. It has been estimated that only about one-third of the entitlements to these special vitamin products were taken up. Other concentrates containing these vitamins could be and were purchased from chemists' shops, but records of purchases outside the scheme were unfortunately not always made in the log-books, so that the full contribution of vitamin supplements to the diet cannot be precisely known. In any event, the purpose of the Government Scheme was to benefit a section of the population forming a small proportion only of the whole, so that it would be misleading to present the data as average

consumption per person of the whole sample. For these reasons it was decided that the amounts of vitamins A, D and C obtained from these supplements should be excluded from the tables and their contribution to the diet discussed in a subsequent report.

Vitamin A

138. According to the Food Consumption Levels estimate,¹ supplies of vitamin A fell in 1940 and 1941 to 90 per cent of the pre-war level and, in order to remedy this, efforts were made to expand the supply of carrots. As an additional safeguard margarine was fortified with Vitamin A, at the rate of 450 to 550 i.u. per oz, from 1940 onwards. In spite of these measures it was not possible to maintain the supply in the diet at a level above 90 to 95 per cent of pre-war.

139. Data are not available for the working-class domestic consumption during the years 1940 and 1941 since the classification of *root vegetables* and of *other meats* at that time was not sufficiently detailed for calculating the contributions from carrots and liver. On the assumption that working-class consumption was in line with supply trends, the totals for the years 1940 and 1941 are likely to have been of the same order as those for the years 1942 to 1945.

140. During the years 1942 to 1945 (Table 50) the chief contributor of vitamin A to the urban working-class diet was carrots, between 33 per cent and 37 per cent of the total vitamin A being derived from this source. In calculating the total contribution of vitamin A, the amount of vitamin A precursor (β -carotene) in vegetables has been reduced by two-thirds to bring it into conformity with the vitamin A as found in butter.² Butter and margarine were next in importance to vegetables, and chiefly as a result of the slight increase in butter consumption, their contribution rose from 20 per cent to 24 per cent of the total during the years 1942 to 1945. Milk provided between 12 and 13 per cent and eggs and cheese, jointly, between 8 and 11 per cent. The greatest variation was found in the amount derived from *other meats* since the supply of liver, one of the richest sources of this vitamin, varied considerably during the period.

TABLE 50
Vitamin A Content of Domestic Food Consumption 1942-1945 (a)
i.u. per head per day

	1942		1943		1944		1945	
		% of total		% of total		% of total		% of total
Root vegetables...	990	33.2	810	26.4	789	24.9	880	27.5
Other vegetables	120	4.0	248	8.1	262	8.2	214	7.4
		—37.2		—34.5		—33.1		—34.9
Fats	584	19.6	664	21.6	680	21.4	690	23.7
Milk	355	11.9	371	12.1	378	11.9	386	13.3
Cheese	178	6.0	163	5.3	135	4.3	129	4.4
		—17.9		—17.4		—16.2		—17.7
Meat, rationed (incl. bacon) ...	26	0.9	25	0.8	24	0.8	24	0.8
Meat, other ...	466	15.6	519	16.9	604	19.0	844	11.8
		—16.5		—17.7		—19.8		—12.6
Eggs	80	2.7	132	4.3	172	5.4	182	6.3
Other foods ...	183	6.1	137	4.5	129	4.1	139	4.8
Total	2982	100.0	3071	100.0	3173	100.0	2908	100.0

(a) Excludes Vitamin Welfare Foods.

¹ Cmd. 7842.

² Recent research has shown that β -carotene in carrots is less readily available than, for example, in green vegetables, but no allowance for this has been made in these calculations. Medical Research Council, Special Report Series No. 264.

141. Table 51 shows that the quantity of vitamin A contributed by rationed foods to the working-class diet remained constant during the years 1943 to 1945, while that from unrationed foods fell slightly. In 1945 half the total vitamin A was derived from rationed foods.

TABLE 51
Vitamin A derived from Rationed and Unrationed Foods 1943-1945

i.u. per head per day

	1943 (a)	1944	1945
RATIONED FOODS			
By weight or value	852	803	842
Points foods	52	82	46
Milk and eggs	495	544	564
	—1,399	—1,429	—1,452
UNRATIONED FOODS			
... ..	1,672	1,744	1,456
Total	3,071	3,173	2,908

(a) Information for 1942 not available.

Vitamin B₁

142. The utilisation of energy by the body depends upon the presence of an adequate quantity of vitamin B₁. According to the Food Consumption Levels estimate supplies of this vitamin rose during the war years to reach, in 1944, a maximum of about two-thirds above the pre-war level. In the early years of the war the fortification of flour with synthetic B₁ was tried but the general introduction of higher extraction flour with its richer vitamin B₁ content removed the need for other measures. As a result, flour fortified with vitamin B₁ never came into general use and only small quantities were consumed. No account has been taken of such fortification in these tables.

143. The changes in the urban working-class diet from 1942 to 1945 are shown in Table 52. The Surveys in 1940 and 1941 (Table 7)¹ recorded about 1.2 mg. From 1942 to 1945 it fluctuated between 1.4 mg. and 1.6 mg., the difference being due almost entirely to the rise in the flour extraction rate. Other important sources were meats, their contribution depending upon the type of unrationed meat available, potatoes and milk.

TABLE 52
Vitamin B₁ Content of Domestic Food Consumption 1942-1945

mg. per head per day

	1942		1943		1944		1945	
		% of total		% of total		% of total		% of total
Bread and flour ...	0.53	37.9	0.62	40.0	0.61	37.7	0.52	35.4
Other cereal products	0.09	6.4	0.07	4.5	0.09	5.5	0.08	5.4
		—44.3		—44.5		—43.2		—40.8
Potatoes	0.27	19.3	0.31	20.0	0.29	17.9	0.28	19.1
Other vegetables	0.10	7.1	0.09	5.8	0.10	6.2	0.10	6.8
		—26.4		—25.8		—24.1		—25.9
Meats	0.21	15.0	0.24	15.5	0.30	18.5	0.25	17.0
Milk	0.14	10.0	0.15	9.7	0.16	9.9	0.16	10.9
Other foods	0.06	4.3	0.07	4.5	0.07	4.3	0.08	5.4
Total	1.40	100.0	1.55	100.0	1.62	100.0	1.47	100.0

144. The chief sources of vitamin B₁ (bread, flour and vegetables) were not rationed so that less than 30 per cent of the total intake was derived from rationed sources (Table 53).

TABLE 53
Vitamin B₁ derived from Rationed and Unrationed Foods 1943-1945

				<i>mg. per head per day</i>		
				1943 (a)	1944	1945
RATIONED FOODS						
By weight or value	...	...	...	0.17	0.20	0.17
Points foods	...	...	...	0.08	0.09	0.10
Milk and eggs	...	...	...	0.16	0.18	0.18
				—0.41	—0.47	—0.45
UNRATIONED FOODS				1.14	1.15	1.02
Total	...	...	...	1.55	1.62	1.47

(a) Information for 1942 not available.

*Riboflavin*¹

145. It is possible that with the low consumption of milk before the war there was some shortage of riboflavin, especially among the lower income groups. According to the Food Consumption Levels estimate, the supply of riboflavin remained at the pre-war level until 1942, when it began to increase. In 1944, when the extraction rate of flour was 85 per cent and supplies of foods were generally at their highest wartime level, it reached 31 per cent above that level.

146. Table 54 shows the chief sources of riboflavin in the urban working-class diet during the years 1942 to 1945. The totals in this table are slightly higher than those shown in Table 7² for 1940 and 1941, those for 1944 were the highest. The decrease in 1945, compared with 1944, is attributable chiefly to the reduction in the extraction rate of flour, although the decrease at the same time from meats was fairly substantial. During this time the amount of riboflavin from milk, its chief source, rose steadily.

TABLE 54
Riboflavin Content of Domestic Food Consumption 1942-1945

										<i>mg. per head per day</i>	
		1942		1943		1944		1945			
			% of total		% of total		% of total		% of total		
Milk	...	0.50	32.5	0.55	33.5	0.58	33.0	0.57	36.1		
Cheese	...	0.07	4.5	0.06	3.6	0.05	2.8	0.05	3.2		
			—37.0		—37.1		—35.8		—39.3		
Bread and flour	...	0.24	15.6	0.28	17.1	0.26	14.8	0.16	10.1		
Other cereal products	...	0.06	3.9	0.04	2.5	0.05	2.8	0.04	2.5		
			—19.5		—19.6		—17.6		—12.6		
Meats	...	0.24	15.6	0.27	16.5	0.31	17.6	0.25	15.8		
Vegetables	...	0.22	14.3	0.23	14.0	0.26	14.8	0.25	15.8		
Eggs	...	0.04	2.6	0.07	4.3	0.10	5.7	0.10	6.4		
Other foods	...	0.17	11.0	0.14	8.5	0.15	8.5	0.16	10.1		
Total	...	1.54	100.0	1.64	100.0	1.76	100.0	1.58	100.0		

¹ Most of the values for riboflavin and nicotinic acid were obtained from the United States Department of Agriculture, Miscellaneous Publications No. 572 and Circular No. 638.

² See Table 8.

147. Table 55 shows that more than half the total riboflavin in the diet was derived from the rationed foods: milk, cheese, meats and eggs.

TABLE 55
Riboflavin derived from Rationed and Unrationed Foods 1943-1945

mg. per head per day

	1943 (a)	1944	1945
RATIONED FOODS			
By weight or value	0.21	0.28	0.19
Points foods	0.08	0.08	0.09
Milk and eggs	0.61	0.66	0.66
	—0.90	—1.02	—0.94
UNRATIONED FOODS	0.74	0.74	0.64
Total	1.64	1.76	1.58

(a) Information for 1942 not available.

*Nicotinic Acid*¹

148. Little is known of the nicotinic acid content of the diet for the years before the war, but from the picture presented by the estimates of food supplies² it appears that in spite of the reduced supplies of meat the increase in the extraction rate of flour caused the amount of nicotinic acid available for consumption in 1944 to rise to 119 per cent of the pre-war level.

149. Table 56 shows that total meats were the chief source of nicotinic acid in working-class domestic diet during the years 1942 to 1945. Cereals were of almost equal importance and vegetables, the next in importance, provided a steady share throughout the period.

TABLE 56
Nicotinic Acid Content of Domestic Food Consumption 1942-1945

mg. per head per day

	1942		1943		1944		1945	
		% of total		% of total		% of total		% of total
Meat, rationed (including bacon)	2.9	24.4	3.1	24.4	3.2	23.0	3.0	22.7
Meat, other ...	1.1	9.2	1.1	8.7	1.6	11.5	1.3	9.9
		—33.6		—33.1		—34.5		—32.6
Bread and flour ...	3.2	26.9	3.4	26.8	3.7	26.6	3.5	26.5
Other cereal products	0.6	5.1	0.5	3.9	0.5	3.6	0.6	4.5
		—32.0		—30.7		—30.2		—31.0
Vegetables ...	2.8	23.5	3.2	25.2	3.3	23.8	3.2	24.2
Fish	0.6	5.1	0.6	4.7	0.7	5.0	0.8	6.1
Other foods	0.7	5.8	0.8	6.3	0.9	6.5	0.8	6.1
Total	11.9	100.0	12.7	100.0	13.9	100.0	13.2	100.0

150. Table 57 shows that approximately one-third of the total nicotinic acid came from rationed foods, of which the most important item was meat.

¹ See footnote to Section on Riboflavin.

² See Table 8.

TABLE 57
Nicotinic Acid derived from Rationed and Unrationed Foods 1943-1945

mg. per head per day

	1943 (a)	1944	1945
RATIONED FOODS			
By weight or value	3.1	3.2	3.0
Points foods	0.8	0.9	0.9
Milk and eggs	0.4	0.4	0.4
	— 4.3	— 4.5	— 4.3
UNRATIONED FOODS	8.4	9.4	8.9
Total	12.7	13.9	13.2

(a) Information for 1942 not available.

Vitamin C

151. Concern was felt early in the war about the vitamin C intake, particularly because of the reduction in fruit imports necessary to save shipping space. To assist in meeting this situation, the growing of leafy green vegetables to replace imported fruits was encouraged and the housewife was instructed on the best methods of cooking these vegetables in order to retain their vitamin C.

152. Table 58 shows the supply of vitamin C represented by the consumption of foods recorded in the Food Survey with no allowance for cooking losses. The picture is distorted because this vitamin is readily lost during storage and cooking, and fruit loses much less than vegetables in the process. A further table (Table 59) makes allowance for this. It is impossible to assess the proportion of the vegetables or fruit eaten raw or cooked, but the following assumptions have been made :

- (a) that all root vegetables, including potatoes, were cooked, and that on cooking¹ they lost 50 per cent of their original vitamin C ;
- (b) that all green vegetables were cooked and that on cooking they lost 75 per cent of their original vitamin C ;
- (c) that losses from fruit and tomatoes were negligible.

153. Both tables show that potatoes contributed between 40 and 50 per cent of the total vitamin C, and that from 1942 to 1945 the contribution from green vegetables increased. According to Table 59, by the end of the war green vegetables and fruit each contributed 20 per cent.

TABLE 58
Vitamin C Content of Domestic Food Consumption 1942-1945 (a)

No allowances for cooking losses

mg. per head per day

	1942		1943		1944		1945	
		% of total		% of total		% of total		% of total
Potatoes	31	40.8	38	45.8	36	41.3	36	41.9
Green vegetables	25	32.9	28	33.8	33	38.0	30	34.9
Other vegetables	8	10.5	7	8.4	8	9.2	7	8.1
Fruit	7	9.2	6	7.2	6	6.9	9	10.5
Other foods	5	6.6	4	4.8	4	4.6	4	4.6
Total	76	100.0	83	100.0	87	100.0	86	100.0

(a) Excluding Vitamin Welfare Foods.

¹ The cooking losses used are those suggested in Medical Research Council War Memorandum No. 14.

TABLE 59
Vitamin C Content of Domestic Food Consumption 1942-1945 (a)

Allowing for cooking losses

mg. per head per day

	1942		1943		1944		1945	
		% of total		% of total		% of total		% of total
Potatoes	16	42.1	19	47.5	18	45.0	18	41.9
Fruit	7	18.4	6	15.0	6	15.0	9	20.9
Green vegetables ...	6	15.8	7	17.5	8	20.0	8	18.6
Other vegetables ...	4	10.5	4	10.0	4	10.0	4	9.3
Other foods	5	13.2	4	10.0	4	10.0	4	9.3
Total	38	100.0	40	100.0	40	100.0	43	100.0

(a) Excluding Vitamin Welfare Foods.

154. Unrationed foods supplied nearly the whole of the Vitamin C consumed (Table 60).

TABLE 60
Vitamin C derived from Rationed and Unrationed Foods 1943-1945 (a)

mg. per head per day

	(b) 1943	1944	1945
RATIONED FOODS			
By weight or value	0	1	1
Points foods	1	0	0
Milk and eggs	3	3	4
	— 4	— 4	— 5
UNRATIONED FOODS	79	83	81
Total	83	87	86

(a) No allowances made for cooking losses and excluding Vitamin Welfare Foods.

(b) Information for 1942 not available.

Vitamin D

155. Estimates are not available for comparison of the supply of this vitamin before and after the outbreak of war nor is it possible to indicate whether pre-war supplies were adequate but, for the working-class diet, data for the years 1942 to 1945 are summarised in Table 61. The chief source, namely fatty fish (such as herrings and pilchards) fluctuated widely, and made its largest contribution in 1943 and 1945. Margarine, which was fortified with 56 i.u. per oz. of vitamin D from 1942, provided a large proportion of the remainder. In January 1945 the rate of fortification was increased to 90 i.u. and this change was responsible for half of the 40 per cent rise in the total vitamin D which occurred that year.

TABLE 61
Vitamin D Content of Domestic Food Consumption 1942-1945

i.u. per head per day

	1942		1943		1944		1945	
		% of total		% of total		% of total		% of total
Fish	49	49.0	60	53.6	48	45.3	65	45.5
Margarine	33	33.0	33	29.4	34	32.0	55	38.4
Other fats	6	6.0	5	4.5	6	5.7	5	3.5
		—39.0		—33.9		—37.7		—41.9
Eggs	6	6.0	9	8.0	13	12.3	13	9.1
Other foods	6	6.0	5	4.5	5	4.7	5	3.5
Total	100	100.0	112	100.0	106	100.0	143	100.0

156. Over two-thirds of the total vitamin D, as shown in Table 62, were provided by rationed foods. Owing to the high vitamin D content of fatty fish, points rationed foods, which included canned fatty fish, provided about 20 per cent of the total vitamin D in urban working-class diets. These foods were more important as a source of vitamin D than of any other nutrient.

TABLE 62
Vitamin D derived from Rationed and Unrationed Foods 1943-1945

i.u. per head per day

	1943 (a)	1944	1945
RATIONED FOODS			
By weight or value	40	41	62
Points foods	23	18	30
Milk and eggs	13	17	16
	— 76	— 76	—108
UNRATIONED FOODS	36	30	35
Total	112	106	143

(a) Information for 1942 not available.

IV. THE NATIONAL DIET AFTER THE WAR 1946 to 1949

The Post-war Food Problem

157. With the close of the war, the problem of maintaining adequate food supplies did not disappear but as mentioned above¹ entered into a new phase, for the cumulative effects of the war, aggravated by the poor harvests of 1945, brought about a world-wide shortage of all the major foods. Food production, it is true, had expanded considerably in the United Kingdom and, for example, in North America, but agriculture elsewhere had suffered severely as a result of the war. At the same time, the demand for food had increased with higher purchasing power in most allied countries, the new needs of erstwhile exporting countries in the Far East and the extra burden thrown on world supplies by the liberated populations of Europe. With world-wide shortages of capital and manpower, the necessary rehabilitation and expansion of agriculture was bound to be slow compared with the urgency of this demand.

158. In Europe wheat harvests were poor because of the general insufficiency of fertilisers and bad weather. Military operations had also taken their toll. Overseas, drought in such countries as India, South Africa and French North Africa caused the crops to fail and the reduction of the rice crop in the Far East, following the Japanese occupation, meant an additional call on the already reduced wheat supplies of the world.

159. General shortage of feedingstuffs in Europe had reduced livestock populations which had also suffered as a result of the fighting. Since the shortage of feeding grains and oilcakes was expected to continue for some time, the prospects of increasing livestock in the near future were small. The outlook for edible oils and fats was equally unpromising. Supplies during the war had been drastically reduced by the loss of the Far Eastern resources and by the suspension of whaling. Although the fleets could be mustered again without much delay the revival of fats production largely depended on agricultural recovery.

160. The immediate supply position for sugar had been affected by the decline of beet sugar production in Europe and by the results of the Japanese occupation of Java and the Philippine Islands. Demand, moreover, had been inflated by the heavy usage for industrial purposes and by the requirements of the armed forces so that despite the continuance of rationing in the main importing countries stocks had run very low. Nevertheless, the prospects of an early recovery were, for this commodity, brighter.

161. The food problems of the United Kingdom were further complicated by balance of payments difficulties although their effects were masked for a short time by the acute shortage of consumer goods of all kinds throughout the world. These difficulties arose from the destruction of United Kingdom overseas assets and their replacement by sterling balances held by other countries, the sharp reversal of the terms of trade compared with before the war, which particularly affected food, and the new pattern of world trade. Formerly the United Kingdom paid for imports from North America by trading favourably with those countries which in turn had a favourable balance with the United States. In the conditions obtaining after the war the rest of the world became

¹ See paragraph 49 above.

a net importer from the United States. The termination of Lend-Lease in 1945 exposed the United Kingdom to the full impact of this new situation and, despite the assistance afforded by an American loan and a credit from Canada, the attempt to regain equilibrium by returning to the convertibility of sterling culminated in the financial crisis of 1947. Thus as the problem of absolute world food shortages receded, the need to balance payments with America became of increasing importance to this country. As in 1941, when Lend-Lease solved the immediate financial problem, the American Congress again came to the rescue and Marshall Aid provided a breathing space in which to make adjustment to the new position.

162. The effect of the world food shortage and currency difficulties upon food supplies in the United Kingdom is reflected in the estimates provided by the Food Consumption Levels Report from which Table 63 is drawn. The Table shows that, compared with 1945, supplies of dairy products, meat, eggs, oils and fats, grain products and vegetables other than potatoes, had all fallen by 1947, and that even potatoes fell below that level in 1948. The only major foods showing an increase were fish, sugar (including syrup), tomatoes and fruit. Nevertheless, as compared with the levels before the war, even in 1947 supplies per head were larger for dairy products, fish and game, potatoes, other vegetables and grain products. By 1949 supplies of eggs, oils and fats, tomatoes and fruit were all above 90 per cent of the pre-war level, only meat remaining at the low level of 68 per cent.

TABLE 63
Food Supplies moving into Civilian Consumption as estimated in "Food Consumption Levels in the United Kingdom," Cmd. 7842 (a)

lb. per head per annum

	Pre-war	1945	1946	1947	1948	1949
Dairy products (milk solids) ...	38.3	49.8	49.4	48.7	49.1	52.4
Meat (edible weight) ...	109.6	86.6	89.9	82.0	73.8	74.6
Fish, game, etc. (edible weight)	32.8	27.8	34.3	36.3	37.2	35.2
Eggs and egg products (shell egg equivalent) ...	24.0	26.1	21.9	20.9	21.3	23.7
Oils and fats ...	45.3	37.0	34.7	33.9	38.1	44.3
Sugar and syrup (sugar content)	109.9	74.1	79.1	85.0	85.3	91.1
Potatoes ...	176.0	260.2	282.0	284.1	237.2	255.5
Tomatoes and fruit ...	141.4	90.9	109.8	132.4	137.4	130.6
Vegetables ...	107.5	127.1	115.8	114.0	117.2	104.5
Grain products ...	210.1	258.0	237.8	240.2	249.4	238.0
Pulses and nuts ...	9.6	6.3	6.4	7.9	5.6	8.9
Beverages ...	14.7	13.7	15.7	15.2	13.2	13.7

(a) Except for 1949.

163. The post-war period up to 1947 was one of increasing difficulty in maintaining United Kingdom food supplies, leading eventually to the rationing of bread and, later, of potatoes. After that year, there were the beginnings of recovery.

164. The year 1946 opened with a warning from the Government that existing shortages of oils and fats, bacon, sugar and meat were likely to continue, and it became necessary to reduce the domestic ration of cooking fats and, later, the allocation to cake manufacturers. But the growing seriousness of the wheat position required the most drastic action. The flour extraction rate was again raised to 85 per cent (after having been reduced in the previous year to 80 per cent) and shortly after to the extreme level of 90 per cent. An extensive "save bread" campaign was organised, the weight of the standard loaf was reduced, biscuit manufacture was reduced by 25 per cent and the

servicing of bread in restaurants was prohibited. These measures proved insufficient, and bread and flour rationing was introduced in July.

165. Nevertheless, the year was not without some improvement. Citrus and other fruits, together with fish, were now coming on to the market in larger quantities and it was also possible to make available some additional sugar. During this year the provision of cheap or free milk and vitamin products to expectant mothers and young children was made a permanent part of the nation's social services when the Welfare Foods Service was associated with the Family Allowances Scheme in July. At that time the price of milk distributed under the service was reduced and cod liver oil and vitamin A and D tablets were provided free of cost.¹

166. The critical year of 1947 began with a series of disasters to agriculture and closed under the shadow of the convertibility crisis. The prolonged cold spell of late winter, after causing severe damage to winter corn and stored potatoes, gave way to extensive floods which further damaged the crops and in addition wrought havoc with sheep and lambs. The intense drought of the summer which followed so severely affected milk yields that during the first nine months of 1947 production was down by 30 million gallons compared with the previous year. At the same time, in order to save currency it was found necessary to reduce imports from dollar sources of wheat, meat, cheese, dried eggs, animal feeds, bacon, canned meat and fish. Further restrictions in consumption were thus unavoidable. The meat ration was reduced to 1s. and the bacon ration was cut in September. The non-priority milk allocation, which was usually raised to 3 or even 4 pints per head per week for at least three months during the flush period, was raised for about two months only in 1947, and in October of that year even the priority allocations were reduced. Only the prospects for sugar production were sufficiently promising to allow an increase in the ration. It was during this year that, for the first time since the introduction of food control, supplies of potatoes gave rise to considerable anxiety. The rationing of bread had stimulated demand for potatoes at a time when their use as animal feedingstuffs was expanding and supplies had been reduced by floods and low yields. The decision, in November, to control the distribution of potatoes meant that for a short period all the major items in the diet were subject to some form of rationing control, a situation which had been avoided even in the worst war years.

167. The following year 1948 was, by contrast, one of expanding supplies with the exception of meat, and further relaxations were possible. Milk production was again increasing and, after a short period during which non-priority allocations were raised to 3½ pints, milk distribution was removed from all restrictions for three weeks provided that priority allowances were met by the retailer. By the spring, potato rationing came to an end. In July, bread, and in December preserves were freed. The margarine ration had been increased in February, and before the year was out some increase in cooking fats and meat was also possible. But the shortage of dollars increasingly troubled the country. During 1947, 50 per cent of our food had come from hard currency areas, as compared with about 25 per cent before the war, and in order to reverse this trend it was proposed to continue the restriction on imports from the United States and to expand trade with the sterling and soft currency countries through the use of bi-lateral and long term contracts and the provision of special inducements to producers.

168. Throughout 1949 the supply of all foods, again with the exception of meat and on this occasion fish, continued to improve. The cheese ration was restored to 2 oz. in May, milk restrictions were again lifted for a short time

¹ See paragraph 25 above. In August 1947 vitamin A and D tablets were also allowed free of cost to nursing mothers for 30 weeks after confinement.

(although the following dry summer again checked production) and the rations of butter, bacon and tea were increased. On the other hand, the fresh meat ration fell as low as 8d., and although by the end of the year it had recovered to 1s. 6d., 4d. of this represented an increase in price. The price problem indeed was becoming insistent, a continued upward trend in prices accompanying the increasing variety in the diet. In particular, the rise in world prices of some of the main subsidised foods threatened to increase the total cost of food subsidies beyond the limit considered desirable by the Government so it was decided, in April and May 1949, to permit an increase in the prices of cheese, meat, margarine and butter to the consumer. The effect of these higher retail prices for both subsidised and non-subsidised foods was to raise the new Index of Retail Food Prices (17th June 1947 = 100) to 108 in 1948 and to 115 in 1949.

The National Food Survey 1945 to 1949

169. After the war, the Survey continued without substantial change in the form finally decided in 1942 (*see* paragraph 51 above). The return to their homes of evacuated families caused a disturbance at the outset similar to that of the original movement out of the towns but, on this occasion, the effect was less marked since, with the cessation of bombing, investigators could cover a more representative area. Of greater consequence was the sudden rise in the birth rate which occurred in 1946. Since the method of the Survey resulted in a bias toward the families with children this effect was soon reflected in the records. The average number of children in the households surveyed increased from 0.94 in 1945 to 1.06 in 1949 (Table 64). The unweighted average for the wartime years (1941 to 1945) was 0.88, that for 1946 to 1949 was 0.99. This increase represented a real change in the composition of the population, having the effect of reducing average food consumption per person.

170. A change in the opposite direction was that brought about by demobilisation. This was the chief reason for an increase in the average number of adults from 2.18 in 1945 to 2.32 in 1947 (Table 64). The extent of this change is not large; it has to be remembered that the returning soldier was in a position for the first time for many years to set up a separate household and, although the housing shortage acted as a deterrent, the number of such households increased during these years tending to decrease the average size. As a result of these several changes, the average household recorded in the Survey had 0.94 children out of a total of 3.45 persons in 1945, and 1.06 children out of a total of 3.62 persons in 1949, the proportion of children thus increasing from 27 per cent to 29 per cent.

171. The number and composition of households recorded in the Survey from 1945 to 1949 are given in the following table:

TABLE 64
Composition of Urban Working-Class Households included in the National Food Survey 1945-1949

	Number of Households	Average number of persons per household			
		Adults (over 21)	Adolescents (14 and under 21)	Children (under 14)	Total
1945	7,225	2.18	0.33	0.94	3.45
1946	8,204	2.29	0.34	0.94	3.57
1947	5,942 (a)	2.32	0.31	0.96	3.59
1948	5,625 (b)	2.30	0.31	0.98	3.59
1949	7,119	2.26	0.30	1.06	3.62

(a) Nine months only.

(b) Ten months only.

172. Small middle-class samples were drawn almost continuously with the working-class sample until September 1947. It was then decided to suspend the general sample in favour of inquiries into the position of special groups such as heavy workers and old age pensioners. But the difficulties in ensuring food supplies during 1947, explained above, and for example the continuance of potato rationing into 1948, made it desirable to reintroduce the general continuous working-class sample in March 1948. There is, as a result, a gap in the data on working-class households for the last quarter of 1947 and for February and March, 1948, and the only information during that winter was collected by one month's survey during January. This gap in the data affects particularly those foods whose consumption is highly seasonal. To provide annual averages that are comparable, an adjustment has been made in the following Tables, where this was appropriate, on the basis of the average seasonal fluctuations during the period. In Appendix B the actual nine months' average for 1947 and ten months' average for 1948 are given.

173. The middle-class survey was not revived when the regular monthly working-class survey was resumed. It is therefore possible that in 1948 and 1949 the sample represented a slightly lower social class than during 1945 and 1947 since the better off working-class households resident in middle-class wards were again automatically excluded. This was the reverse process to that noted in paragraph 50 above when the middle-class sample was first introduced, in 1944, as a regular feature of the Survey.

Urban Working-class Diet 1945 to 1949

174. The effect of the sharp changes in the national diet which occurred during the immediate post-war years can be analysed in some detail from the survey of urban working-class diets during that period. The general picture is given in Table 65 where comparison is made with the last war year (1945).

TABLE 65
Domestic Consumption of Principal Foods 1941 and 1945-1949

	1941	1945	1946	1947 (c)	1948 (e)	1949	As percentages of 1945			
							1946	1947	1948	1949
Milk (including condensed) (a) pt.	3.6	4.4	4.3	4.3	4.3	4.7	98	98	98	107
Cheese oz.	1.9	2.5	2.5	2.2	2.0	2.2	100	88	80	88
Meat (including bacon) oz.	28.6	26.4	26.6	24.6	23.1	22.7	101	93	88	86
Fish (including canned) oz.	5.8	9.2	10.6	9.5	10.0	8.4	115	103	109	91
Eggs (including dried) (b) no.	1.4	3.0	2.5	2.1	2.2	2.8	83	70	73	93
Fats (i.e., butter, margarine, and cooking fats) oz.	8.3	8.6	8.2	7.8	8.9	10.7	95	91	103	124
Sugar oz.	8.6	9.1	9.6	10.2	10.2	10.9	105	112	112	120
Preserves oz.	4.0	5.5	5.4	5.5	6.2	6.3	98	100	113	114
Potatoes (including chips) oz.	69.4	68.5	73.8	69.8	64.0	68.9	108	102	93	101
Other roots oz.	6.3	8.6	8.1	7.3	6.9	5.9	94	85	80	69
Other vegetables (including canned) oz.	20.2	27.7	26.5	23.5	25.8	25.2	95	85	93	91
Fruit (including canned, dried, and nuts) oz.	7.7	15.9	15.7	23.3	22.1	22.4	99	146	139	141
Cereals oz.	86.0	85.5	82.5	83.7	89.2	85.4	96	98	104	100

- (a) Condensed milk as equivalent pints of liquid milk.
 (b) Dried egg as equivalent numbers of shell eggs.
 (c) Averaged over nine months and adjusted for seasonal trend.
 (d) Not adjusted for seasonal trend.
 (e) Averaged over ten months and adjusted for seasonal trend.

175. The diets examined in the post-war surveys record a general decline by 1947 in the consumption of all foods with the exception of fish, sugar, preserves, potatoes and fruit. Even milk consumption declined slightly. Consumption of fats and cereals and in a smaller degree of green vegetables recovered in 1948 but potatoes and other root vegetables were particularly scarce in the earlier months and the consumption of cheese and eggs declined further. By 1949 the consumption of milk, cheese and eggs recovered and by then most foods were being consumed at a higher rate than in 1945, particularly fats and fruit. The important exceptions were meat and bacon (which together reached only 89 per cent of 1945 levels) eggs (93 per cent), roots other than potatoes (69 per cent), vegetables other than roots (91 per cent) and fish (which had declined from the high level of 115 per cent in 1946 to 91 per cent in 1949). The fluctuating composition of the diet during this period is well illustrated by potatoes and cereals, the two buffer foods. During 1946 the highest consumption of potatoes was recorded since the beginning of the National Food Survey but at that time it was necessary to introduce rationing for bread and other cereal foods. By contrast, in 1948, when potato rationing was in force the consumption of cereal foods reached the highest level in the Survey records.

176. Of particular interest is the comparison in Table 66 during the post-war years of food consumption expressed as nutrients. The difficulties of maintaining the diet during 1947 are shown in the reduced intake of fat, nicotinic acid and vitamin C for that year. These reductions resulted largely from decreases in the fats and meat rations and from the shortage of potatoes and green vegetables in the spring of 1947 following an exceptionally cold winter. Other nutrients show steady or improving levels of intake during the post-war years and even fat and vitamin C shared in this improvement after 1947.

TABLE 66
Energy Value and Nutrient Content of Domestic Food Consumption 1945-1949

	1945	1946	1947 (a)	1948 (b)	1949	1949 as percentage of 1945
Energy value... Cal.	2,375	2,307	2,308	2,387	2,425	102
Protein ... g.	76	78	77	77	76	100
Fat ... g.	92	86	82	88	95	103
Calcium ... mg.	875	912	996	1,012	1,030	118
Iron ... mg.	12.7	14.4	14.3	14.2	13.6	107
Vitamin A ... i.u.	2,908	2,926	2,929	3,143	3,146	108
Vitamin B ₁ ... mg.	1.47	1.55	1.52	1.57	1.53	104
Riboflavin ... mg.	1.58	1.65	1.64	1.65	1.64	104
Nicotinic acid mg.	13.2	14.5	12.9	12.8	12.7	96
Vitamin C ... mg.	86	89	77	96	90	105
Vitamin D ... i.u.	143	137	125	140	130	91

(a) First three quarters only.

(b) Excluding February and March.

177. Comparison of 1949 with 1945 shows that, with the exception of protein, the intake of which had not changed, and of nicotinic acid which decreased by 4 per cent, the intake of all nutrients had increased in proportions varying from 2 per cent to 7 per cent. The extraction rate of flour was 80 per cent in 1945, and 85 per cent in 1949, and this difference was largely responsible for the greater intakes of iron, vitamin B₁ and riboflavin in the latter year. Expanding milk production and the policy of doubling the calcium carbonate added to the flour were responsible for the increases in calcium intake from 1946 onwards. Vitamin C intake benefited from increased fruit supplies at a time when the consumption of vegetables was declining; when allowances are

made for probable cooking losses intake in 1949 was about 15 per cent above that in 1945. By 1949 the chief defect in the pre-war diet, the calcium shortage, had been reduced and perhaps removed, as the result of the increased consumption of milk and of flour fortified with calcium carbonate. The higher extraction rate of this flour also possibly remedied any pre-war deficiencies of B complex vitamins and of iron.

178. In 1949, as in 1945, foods which were rationed or subject to some form of controlled distribution still accounted for more than half the total intake of fat, calcium, riboflavin and vitamin D (Table 67). The contribution of these foods to total calcium intake declined from 65 per cent to 55 per cent reflecting the increased contribution of the unrationed cereal foods. The contribution of points rationed foods which in 1945 was generally less than 10 per cent had fallen by 1949 to 5 per cent or less. Milk, eggs and the unrationed buffer foods still played a major role but bread and flour assumed an even greater importance. The reduced contribution of fresh vegetables to vitamin A intake (from one-third of the total in 1945 to one-fifth in 1949) was due to the reduced consumption of root vegetables. The consumption of fresh green vegetables had also fallen between these two years but increased supplies of fruit compensated for this.

TABLE 67
Proportion of Energy Value and Nutrients in Domestic Consumption
derived from Rationed and Unrationed Foods in 1949

	Cal- ories	Pro- tein	Fat	Cal- cium	Iron	Vit. A	Vit. B ₁	Ribo- flavin	Nico- -tinic acid	Vit. C	Vit. D
	%	%	%	%	%	%	%	%	%	%	%
RATIONED FOODS (a)											
By weight or value	27.6	14.1	58.0	7.3	12.9	29.9	7.0	14.1	18.8	—	49.2
Points foods	5.0	3.8	3.6	4.0	4.9	1.7	1.8	3.4	3.3	0.9	7.2
Milk and eggs	10.8	19.3	16.4	43.9	7.2	18.2	12.8	39.8	3.2	3.3	12.2
Total	43.4	37.2	78.0	55.2	25.0	49.8	21.6	57.3	25.3	4.2	68.6
UNRATIONED FOODS											
Bread and flour	29.8	32.9	3.3	29.6	33.8	—	41.2	17.1	29.1	—	—
Potatoes	7.8	5.9	1.4	2.0	9.6	—	18.3	6.9	17.6	42.2	—
Fresh vegetables	0.8	1.7	—	3.3	4.6	21.5	3.9	3.0	3.2	34.3	—
Other foods	18.2	22.3	17.3	9.9	27.0	28.7	15.0	15.7	24.8	19.3	31.4
Total	56.6	62.8	22.0	44.8	75.0	50.2	78.4	42.7	74.7	95.8	31.4
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

(a) *I.e.*, either rationed or subject to some form of controlled distribution.

Consumption of Individual Foods 1945 to 1949

179. The consumption of the principal foods after the war is dealt with in detail in the following Section. For purposes of comparison the figures for 1945, the last war year, are included in all the tables.

MILK

180. Milk production was sufficient in 1945, compared with 1939, to make possible an increase of 45 per cent of fresh milk supplies. This level was maintained after the war until 1948 when it rose abruptly to an increase of 50 per cent and by 1949 to 57 per cent. At these levels it was possible to remove all restrictions on sales for three weeks during the flush period of 1948 and fifteen weeks during the similar period of 1949.

181. Records of urban working-class domestic consumption reflect these changes in the supply position. The continuous increase in liquid milk consumption per head during the war years was checked when the expansion in production temporarily halted in the immediate post-war years. (Table 68). Nevertheless, further inducement to consumption was provided by the new arrangements introduced in July 1946 reducing the price of cheap milk to 1½*d.* a pint compared with the ordinary price of 5*d.* so that when supply conditions permitted consumption quickly regained its upward trend. By 1949 it had risen to the new high level of 4·36 pints per head per week, or 50 per cent more than before the war. The increase from 1946 to 1949 was largely in the form of milk retailed at the full price and represented an improvement in the diet of the general consumer. That this should have happened while the diet was also becoming more varied is of importance; it has to be remembered naturally that at the subsidised price milk was still economically attractive compared with many of the more expensive foods responsible for the increased variety in the diet.

TABLE 68
Domestic Consumption of Liquid Milk 1945-1949

pt. per head per week

	1945	1946	1947	1948	1949
Milk retailed at full price ...	2·93	2·86	2·82	2·95	3·26
National Scheme milk ...	0·92	0·90	0·88	0·90	0·91
School milk ...	0·26	0·19	0·15	0·17	0·19
Total ...	4·11	3·95	3·85(a)	4·02(a)	4·36
Average non-priority allowance	2·37	2·38	2·40	2·52(b)	2·73(c)

(a) Adjusted for seasonal trend.

(b) Unrestricted sales for 3 weeks.

(c) Unrestricted sales for 15 weeks.

182. The consumption of processed milk is shown in Table 69 to have altered little after the war. By 1948 milk production was sufficient to permit an increase in the quantity going for manufacturing purposes.

TABLE 69
Domestic Consumption of Condensed and Dried Milk 1945-1949

equivalent pt. per head per week

	1945	1946	1947	1948	1949
Condensed unsweetened whole	0·02	0·07	0·14	0·07	0·10
Condensed sweetened whole ...	0·02	0·03	0·04	0·03	0·04
Condensed sweetened skimmed	0·06	0·04	0·05	0·04	0·05
Dried whole ...	0·04	0·06	0·17	0·18	0·16
Dried skimmed ...	0·18	0·16	0·05	—	—
Total ...	0·32	0·36	0·45(a)	0·32(a)	0·35

(a) Adjusted for seasonal trends.

183. The seasonal variation in the consumption of all milk during the post-war years is shown below. The range (for 1946 and 1949 only) shows little difference from the war years.

TABLE 70

Domestic Consumption of Liquid Milk at Different Seasons 1945-1949

pt. per head per week

	1945	1946	1947	1948	1949
First quarter	3.86	3.83	3.85	(a)	4.12
Second quarter	4.38	4.35	4.19	4.30	4.91
Third quarter	4.26	3.94	3.84	4.20	4.16
Fourth quarter	3.96	3.66	(a)	4.03	4.25
Range	0.52	0.69	—	—	0.79

(a) Not available.

184. Milk is seen from Table 71 to have maintained its nutritional importance after the war, except that its contribution of calcium was proportionately smaller, especially in 1947 and 1948 when bread consumption increased and larger quantities of calcium carbonate were added to the flour. Milk consumption was expanding during these years, but despite the food shortages and economic difficulties, other sources of nutrients were increasing at a similar rate.

TABLE 71

Proportions of Total Energy and Nutrients derived from all Milk in Domestic Consumption 1945-1949

	1945	1946	1947	1948	1949
Energy value (calories) ...	% 9.5	% 9.6	% 9.7	% 9.6	% 10.1
Protein	15.8	15.4	15.6	15.6	17.1
Fat	13.4	14.0	14.9	14.8	14.4
Calcium	49.1	46.0	42.4	42.4	44.4
Iron	2.9	2.6	2.6	2.7	3.0
Vitamin A	13.3	13.0	13.2	13.9	13.7
Vitamin B ₁	10.9	10.3	10.5	10.2	11.1
Riboflavin	36.1	33.3	34.2	33.9	35.4
Nicotinic acid	2.9	2.6	3.0	3.0	3.2
Vitamin C	4.4	3.9	4.6	3.9	3.5
Vitamin D	2.8	3.0	3.8	2.4	2.3

CHEESE

185. After the close of the war, home production of cheese increased slightly although still continuing well below the level before the war, but by 1948 imports had fallen so considerably that for the first time since 1941 total supplies returned to the pre-war level. During 1949 there was some recovery. By this time the switch to non-dollar sources resulted in the import of large quantities of special cheeses for distribution outside the ration. The unrationed cheeses and the special allowances for rationed cheese, which were continued into the post-war period, explain why consumption as shown in Table 72 kept above the ration. During this period the average weekly ration was reduced from 2.4 oz. to 1.8 oz. and total consumption fell, but less steeply, from about 2.5 oz. to under 2.2 oz.

TABLE 72
Domestic Consumption of Cheese 1945-1949

oz. per head per week

	1945	1946	1947	1948	1949
Consumption	2.49	2.54	2.20(a)	2.00(a)	2.15
Average level of ration ...	2.4	2.4	2.0	1.6	1.8

(a) Adjusted for seasonal trend.

MEAT

186. In contrast with most other foods composing the urban working-class diet during the years 1945 to 1949, there was no recovery in meat supplies. Meat production was particularly affected first by the shortage of feedingstuffs, aggravated by drought overseas and in this country in 1947 by floods, and later by the balance of payment difficulties in this country. Moreover, the reversion from the extended arable basis of farming could not take place quickly. Total United Kingdom supplies of meat as a result declined from the level of 83 per cent of pre-war in 1946 to 75 per cent in 1949. Even corned meat and other canned meats, which represented as much as 18 per cent of total supplies in 1946 and served to eke out the supplies of fresh and frozen meat, fell to under 10 per cent of a substantially smaller total in 1949.

187. The meat ration which had remained at the level of 1s. 2d. since the middle of 1941, was raised by 2d. in July 1946 and kept at this rate for 12 months. In July 1947 it was reduced again to 1s. 2d. and in the following September to 1s. This low level was retained until March 1949 in which month it even fell to 10d. But from then onwards the ration rose quickly to 1s. 6d. in October, finishing the year at that level. Reckoned as fresh meat, the ration varied between 1s. and 1s. 2d. in 1945 and 1946, fell to 1s. throughout 1947, ranged between 10d. and 1s. in 1948 and between 1s. and 1s. 6d. (of which 4d. represented an increase in price) in 1949. In Table 74 the ration level is shown as an annual average. On this basis it was highest in 1946 and lowest in 1948. The consumption of corned meat was highest in 1947.

188. Table 73 shows the working-class consumption of rationed meat, other than bacon, over these years. Assuming that the Ministry of Labour estimate of nearly 20 oz. per head per week represented the pre-war consumption of these meats, the level had fallen by almost 40 per cent in 1949. As compared with 1945, the reduction was 12 per cent, attributable largely to the diminished consumption of mutton and lamb. The contribution of corned meat to the total consumption of rationed meat, after rising as high as 15 per cent in 1947 was 5 per cent in 1949. Expenditure on rationed meats was much the same in 1949 as in 1945 but the purchased quantity was 12 per cent less.

TABLE 73
Domestic Consumption of and Expenditure on Rationed Meat 1945-1949

per head per week

	1945	1946	1947 (a)	1948 (a)	1949
Beef and veal oz.	6.3	7.5	6.3	6.6	6.5
Mutton and lamb oz.	6.1	5.8	5.8	4.7	4.8
Pork oz.	1.4	0.4	0.1	0.1	0.1
Corned meat oz.	0.7	1.3	2.2	1.1	0.6
Total oz.	14.5	15.0	14.4	12.5	12.0
Expenditure on rationed meat <i>d.</i>	15.1	15.8	16.1	13.7	15.4
Ration entitlement <i>d.</i>	14.0	14.9	14.4	12.0	14.1

(a) Adjusted for seasonal trend.

189. The consumption of other meats, excluding rationed meat and bacon (Table 74), remained at about the same level (8 oz.) after the war as during the war, if the high level of 9½ oz. reached in 1944 is excepted. But the composition of this group showed some changes during the post-war years, the consumption of sausages, rabbits, poultry and game increasing at the expense of canned meats.

TABLE 74
Domestic Consumption of Meat Offals, Canned Meat, Sausages, etc.
1945-1949

	<i>oz. per head per week</i>				
	1945	1946	1947 (a)	1948 (a)	1949
Liver, kidney and other offal	1.42	1.33	1.18	1.34	1.28
Rabbits, poultry, game ...	0.96	0.82	0.65	1.10	1.38
Cooked meat, bacon and ham	0.42	0.40	0.40	0.07	0.43
Canned meats	1.64	1.65	1.73	1.24	0.72
Sausages	3.87	4.18	4.30	4.80	4.19
Total	8.31	8.38	8.26	8.55	8.00

(a) Adjusted for seasonal trend.

190. Production difficulties and dollar shortages combined to cause a steep fall in bacon supplies. In 1945 these stood at about 67 per cent of the 1934-38 average; by 1947 they had fallen to the low level of 37 per cent and even in 1949, when there was some recovery, supplies were only 48 per cent of the pre-war level. The ration was reduced in May 1945 from 4 oz. to 3 oz. and to 2 oz. at the beginning of 1947. It remained at or just below this level until the second half of 1949 when it was raised again to 3 to 4 oz. Working-class household consumption which followed these changes closely is shown in Table 75.

TABLE 75
Domestic Consumption of Bacon 1945-1949

	<i>oz. per head per week</i>				
	1945	1946	1947	1948	1949
Consumption	3.54	3.22	1.95(a)	2.05(a)	2.68
Average level of ration ...	3.4	3.0	1.8	1.9	2.5

(a) Adjusted for seasonal trend.

191. The working-class consumption of *all meats*, including rationed and processed meats and bacon, was 23 oz. This may be compared with about 29 oz. purchased in 1941 and 27 oz. consumed in 1944, and was about two-thirds of the pre-war level recorded by the Ministry of Labour. Their diminished contribution to the diet is shown clearly when considered in terms of calories and nutrient values. (Table 76.) During the war meats accounted for about 13 per cent of the total calories; after 1945 the proportion fell to below 12 per cent and reached 9.3 per cent in 1949. In 1945 meats provided about 33 per cent of the total nicotinic acid, over 25 per cent of the total fat and about 20 per cent of the total protein in the diet: by 1949 the proportions were 28 per cent of the nicotinic acid, 20 per cent of the fat and 17 per cent of the protein. The contribution of iron remained roughly constant at about 20 per cent.

TABLE 76
Proportion of total Energy Value and Nutrients in Domestic Consumption
derived from all Meats 1945-1949

	1945	1946	1947	1948	1949
Energy value (calories) ...	%	%	%	%	%
Protein—animal	12.5	11.7	11.1	9.6	9.3
Fat	18.4	19.2	19.5	16.9	17.1
Calcium	28.2	25.6	28.0	23.8	20.0
Iron	1.7	1.8	1.6	1.5	1.4
Vitamin A	21.3	22.2	26.6	21.8	19.1
Vitamin B ₁	12.6	13.9	14.8	14.7	15.3
Riboflavin	17.0	12.3	11.9	10.2	10.5
Nicotinic acid	15.8	15.1	14.0	14.6	14.0
	32.6	27.6	31.0	28.2	28.4

FISH

192. After the war, with the return of British vessels to fishing, the resumption of imports from Scandinavian countries and the greatly increased populations of fish built up as the result of the suspension of large-scale fishing during the war, supplies of fresh fish were again abundant. Landed weights of fresh fish, which in 1938 were 20,000 tons a week and in 1945 just under 10,000 tons, by 1946 reached 17,000 and during 1947 to 1949 maintained a level of 18 to 19,000 tons a week. With the accompanying shortage of meat, the result was to raise the working-class consumption of all fish other than canned fish beyond even the high level of 1945 (Table 77). But with the greater variety of foods comprising the diet from 1946 onwards, fish consumption began to fluctuate, reflecting a growing measure of choice by the consumer. The fall in 1947 probably reflects the abnormally hot weather and the increased possibility that year of substituting cheese, eggs and fat (in the form of spreads) for fish, since there was no marked increase in price at that time. By 1949 meat was still scarce, and although fish consumption continued to be higher than before the war, it was much lower than in 1948, due possibly because of the increasing variety in the diet and the recurrence of a hot summer.

193. Supplies of canned fish after 1945 were affected by the considerable fall in imports with the termination of Lend-Lease and the difficulty of replacing these supplies with canned fish from Norway, Portugal and North Africa. Imports which stood at 77,000 tons in 1938 had fallen to 39,000 tons by 1945. During 1946 and 1947 the pre-war level had been regained, but in 1949 fell to 46,000 tons. Records of working-class consumption of canned fish show a similar fluctuation. As a result the consumption of all fish, fresh and processed, which had risen from 9.2 oz. in 1945 to 10.6 oz. in 1946, fell to 8.4 oz. by 1949 or 10 per cent below the level of 1945.

TABLE 77
Domestic Consumption of Fish 1945-1949

oz. per head per week

	1945	1946	1947	1948	1949
Fresh, dried and smoked ...	6.71	8.03	7.08	7.65	6.27
Fried	1.51	1.59	1.71	1.91	1.69
Canned	0.99	0.93	0.70	0.40	0.42
Total	9.21	10.55	9.49	9.96	8.38

EGGS

194. With the close of the war, egg supplies began quickly to revert to the pre-war pattern. Imports of dried eggs dwindled almost to nothing, first with the termination of Lend-Lease and thereafter because of the shortage of dollars. But increased home production and increased imports of shell eggs, which together brought about a 40 per cent increase in supplies by 1948 compared with 1945, and a 70 per cent increase by 1949, largely compensated for the loss of dried eggs. In 1946, dried eggs were put on points and, in 1949, allocations were suspended altogether, except to priority classes; by this time the allocation of shell eggs was about 70 per cent more than in 1945 and during the flush period of the year they were on sale for a few weeks without restriction. The egg consumption of urban working-class households since 1945 reflected these changes (Table 78). The average consumption of 2.75 shell eggs in 1949 was about one egg less than the pre-war level, and the total consumption of shell and dried eggs was about 95 per cent of the 1945 level. Average consumption per head of "free" eggs was about the same for both 1945 and 1949, but they accounted for about one-fifth of the total consumption at the earlier date as compared with one-tenth at the end of the period.

TABLE 78
Domestic Consumption of Eggs 1945-1949

eggs or equivalent eggs per head per week

	1945	1946	1947	1948	1949
Shell eggs	1.27	1.41	(a) 1.45	(a) 1.85	2.75
Dried eggs	1.74	1.09	0.68	0.38	0.22
Total	3.01	2.50	2.13	2.23	2.97
Non-priority allocation of shell eggs	0.90	1.02	1.12	1.50	2.04

(a) Adjusted for seasonal trend.

FATS

195. With the resumption of imports after the war, the supply of butter immediately improved and was not much affected by the subsequent dollar crisis. Already in 1945 imports showed an increase of 25 per cent over 1944; by 1949 this increase had amounted to 110 per cent. Nevertheless, at this latter date, imports were still only about three-quarters of the pre-war level.

196. It was possible to raise the butter ration at the end of 1945 from 2 oz. a week to 4 oz. and 2 oz. in alternate weeks and to keep it at that level with few changes until 1948. From 23rd May to 17th July in that year, and again from July 1949 onwards, it was raised to 4 oz. each week. Working-class consumption followed the ration closely and by 1949 had risen to about half of the pre-war level as recorded by the Ministry of Labour.

197. World shortage of oils and fats occasioned some setback in margarine supplies during 1946 and 1947, but by 1948 there was partial recovery so that in the following year the level exceeded that of 1945 and had risen to 102 per cent above the pre-war average. Throughout the post-war years margarine could be taken in lieu of the full butter ration. The combined margarine and butter ration was kept at the 6 oz. level until February 1948, when it was raised to 7 oz., and again in 1949 to 8 oz. Records of working-class consumption (Table 79) show a fall during the years 1945 to 1947 followed by a recovery in 1949 to a level higher than that for 1945, representing almost a 50 per cent

increase above pre-war. Since the butter ration was fully taken up, only about two-thirds of the margarine ration was used by the households.

198. Production of compound cooking fat, on which the ration of cooking fats came increasingly to depend after the cessation of Lend-Lease supplies of lard, reached a low level in 1944 but steadily improved after that year to reach a level in 1949 corresponding to an increase of 130 per cent over the average for 1934 to 1938. From November 1945 to March 1946, the ration was 2 oz., and from March 1946 to December 1948 1 oz. It was then raised again to 2 oz.

199. By 1949 as the result of these changes, total fats consumption had increased by about one-quarter compared with 1945. The 1949 total, an average of nearly 11 oz., may be compared with the total consumption of just over 13 oz. of butter, margarine, lard, suet and dripping, recorded by Orr before the war.

TABLE 79
Domestic Consumption of Fats 1945-1949

oz. per head per week

	1945	1946	1947	1948	1949
BUTTER					
Consumption	2.16	2.83	(a) 2.80	(a) 3.20	3.50
Average level of ration	2.10	2.85	2.85	3.15	3.46
MARGARINE					
Consumption	4.19	3.46	(a) 3.40	(a) 3.90	4.23
Maximum ration	6.0	6.0	6.0	6.9	7.5
RATIONED COOKING FATS					
Consumption	1.51	1.17	1.00	1.06	2.09
Average level of ration	1.5	1.2	1.0	1.1	2.1
TOTAL RATION FATS CONSUMPTION	7.86	7.46	7.20	8.16	9.82
Suet and dripping consumption	0.77	0.77	0.64	0.72	0.85
Total fats consumption	8.63	8.23	7.84	8.88	10.67
Purchases of suet and dripping	0.29	0.36	0.28	0.37	0.44

(a) Adjusted for seasonal trend.

FRUIT AND VEGETABLES

200. After the end of the war, supplies of fresh fruit and tomatoes were among the first to expand. By 1947, imports of bananas had risen to one-third of pre-war and of oranges to three-quarters, imports of other fresh fruit had reached pre-war levels and of tomatoes had increased by one-quarter. Supplies were further helped by a series of good home crops so that, for example, total supplies of tomatoes for civilian consumption in 1947 were 40 per cent larger than before the war. The supply of canned and bottled fruit also improved, but the quantities of dried fruits decreased, due largely to the failure of the Australian vine harvest in successive years and later, in some degree, to shortage of dollars. With these more abundant supplies, working-class household consumption of fruit and vegetables increased by nearly 50 per cent from 1945 to 1949, the consumption of tomatoes alone increasing by over 100 per cent.

TABLE 80
Domestic Consumption of Fruit 1945-1949

oz. per head per week

	1945	1946	(c) 1947	(c) 1948	1949
Tomatoes	2.63	2.89	5.26	5.15	5.80
Oranges	2.64(b)	2.28	4.54	3.65	3.13
Apples	5.21	4.14	4.41	6.23	5.99
Other fresh fruit (a)	3.35	4.25	6.34	4.57	4.52
Total fresh fruit	13.83	13.56	20.55	19.60	19.44
Canned and bottled fruit and tomatoes	0.60	0.88	1.50	1.50	1.79
Dried fruit	1.51	1.24	1.25	1.00	1.19
Total	15.94	15.68	23.30	22.10	22.42

(a) Includes rhubarb.

(b) Includes other citrus fruit.

(c) Adjusted for seasonal trend.

201. The production of potatoes continued to expand after the war and although in relation to the new high level of consumption, there was a severe shortage in 1947 and 1948 brought about by frosts, floods, and the crop failure in 1947, the potato harvest exceeded the wartime level both in 1946 and in 1948. Working-class consumption (Table 81) reached a peak at 74 oz. per head per week in 1946, nearly 25 per cent higher than pre-war, but with the shortage of supplies which brought about rationing consumption fell to 64 oz. in 1948. Rationing lasted from the end of 1947 until April 1948 with an ordinary entitlement of not more than 48 oz. per person. Children under 5 could obtain half that quantity and expectant mothers 72 oz.

TABLE 81
Domestic Consumption of Potatoes 1945-1949

oz. per head per week

	1945	1946	(a) 1947	(a) 1948	1949
Potatoes	65.73	70.52	66.23	59.59	65.39
Chips	2.77	3.29	3.57	4.41	3.54
Total	68.50	73.81	69.80	64.00	68.93

(a) Adjusted for seasonal trend.

202. The nutritional importance of potatoes in the diet showed little change during this period (Table 82) compared with the war years, and they still continued to provide about 8 per cent of total calories.

TABLE 82
Proportion of total Energy Value and Nutrients in Domestic Consumption derived from Potatoes (including chips) 1945-1949

	1945	1946	1947	1948	1949
	%	%	%	%	%
Energy value (calories) ...	7.7	8.5	8.4	8.0	7.8
Protein	5.8	6.1	5.9	5.8	5.9
Fat	1.1	1.4	1.6	2.0	1.4
Calcium	2.3	2.4	2.1	2.0	2.0
Iron	10.5	9.4	9.4	9.7	9.6
Vitamin B ₁	19.1	20.0	19.7	18.4	18.3
Riboflavin	9.4	9.7	9.4	8.8	6.9
Nicotinic acid	17.3	16.9	18.3	17.3	17.6
Vitamin C	41.9	42.7	42.8	44.8	42.2

203. During the years 1945 to 1949 there was a small increase in the acreage under fresh green vegetables, but working-class consumption of these and other vegetables, apart from potatoes (Table 83), declined from over 36 oz. in 1945 to about 31 oz. in 1949. Nevertheless this reduced level was still above Orr's rough pre-war estimate of 26 oz. The decline affected all the groups shown in the Table, except canned and dried vegetables which increased by about 25 per cent and combined with the increased consumption of fresh fruit, resulted in a fall in the proportion of the vitamin C in the diet derived from fresh vegetables (allowing for cooking losses) from 18 per cent in 1946 to 12 per cent in 1949.

TABLE 83
Domestic Consumption of Vegetables other than Potatoes 1945-1949

oz. per head per week

	1945	1946	1947	1948	1949
Fresh green	14.67	14.87	9.32	13.12	12.09
Fresh peas and beans	3.85	2.77	3.33	4.29	2.77
Turnips, swedes, other root vegetables including onions and shallots	10.02	9.21	10.17	8.47	8.66
Carrots	3.93	3.64	3.09	3.46	2.83
Canned and dried	3.85	4.08	4.86	3.32	4.64
Total	36.32	34.57	30.77	32.66	30.99

204. Consumption of the main groups of vegetables by season is shown in Tables 84 and 85 and the decline after the war is seen to have been least during the third quarter of the year so far as green vegetables are concerned (one-tenth as against one-fifth in each of the other quarters). The abnormally low consumption of green vegetables in the first and second quarters of 1947 was chiefly the result of the bad weather reducing supplies.

TABLE 84
Domestic Consumption of Fresh Vegetables by Season 1945-1949

oz. per head per week

	Root vegetables					Green vegetables					Fresh beans and peas				
	1945	1946	1947	1948	1949	1945	1946	1947	1948	1949	1945	1946	1947	1948	1949
First quarter ...	14.30	12.94	15.51	(a)	13.81	13.99	14.23	9.20	(a)	13.02	—	—	—	—	—
Second quarter ...	5.36	5.42	9.28	6.11	7.84	16.64	17.52	8.09	15.17	15.32	1.42	0.16	0.47	2.23	1.88
Third quarter ...	10.11	8.01	8.90	10.52	7.30	12.15	12.84	10.65	11.01	8.98	13.14	10.15	9.46	10.71	8.34
Fourth quarter ...	15.03	15.35	(a)	14.79	12.30	15.88	14.90	(a)	13.71	11.06	0.82	0.73	(a)	1.34	0.82

(a) No survey.

TABLE 85
Averages for 1943-1945 compared with averages for 1946-1949

oz. per head per week

	Green vegetables		Fresh beans and peas	
	1943-1945	1946-1949	1943-1945	1946-1949
First Quarter	15.16	12.15	—	—
Second Quarter	18.03	14.25	1.42	1.18
Third Quarter	11.79	10.87	12.94	9.66
Fourth Quarter	16.34	13.22	0.83	0.96

205. Fluctuation in the supplies of vegetables obtained from gardens and allotments are indicated by the records of potatoes and other fresh vegetables obtained free which consist mainly of these items. The figures for 1945 to 1949 in Table 86 are given as quarterly averages, and they refer to all households whether or not possessing gardens or allotments; the benefit to the particular households obtaining supplies is naturally much larger. Over the period, the contribution of free potatoes to the diet fluctuated considerably, but if 1948 is excepted a slight decline is recorded. During 1948, this contribution almost doubled, undoubtedly as the result of the introduction of rationing in November of the previous year. Home-grown vegetables other than potatoes, as shown by records of free food supplies, continued to be of importance during 1945 and 1949, particularly in the third and fourth quarters, although fluctuating considerably in quantity from year to year. Expressed as values, supplies of both potatoes and of other fresh vegetables showed little change annually or seasonally when 1949 is compared with 1945 (Table 87) except that the third quarter shows a small reduction in the value of other vegetables. Taking the monthly records each year from July to September, the value averaged over all households in the sample of free fresh vegetables, including potatoes, and of fresh fruit was 3*d.* to 4*d.* in 1946, 4½*d.* to 5½*d.* in 1947, 5*d.* to 6½*d.* in 1948 and 3*d.* to 5*d.* in 1949, compared with 5*d.* to 6*d.* in 1944.

TABLE 86
Free Fresh Vegetables consumed by Urban Working-Class Households
1945-1949

oz. per head per week

	1945	1946	1947	1948	1949	Average
POTATOES						
First quarter	—	0·08	0·04	—	0·01	0·03
Second quarter	0·14	0·14	0·03	0·29	0·13	0·15
Third quarter	3·65	3·19	3·94	6·77	3·09	4·13
Fourth quarter	0·61	0·77	(a)	0·44	0·70	0·63
OTHER FRESH VEGETABLES						
First quarter	1·24	1·52	0·76	1·51(b)	1·50	1·31
Second quarter	1·40	1·24	0·74	1·72	1·30	1·28
Third quarter	7·14	4·96	5·62	6·76	4·82	5·86
Fourth quarter	3·99	2·55	(a)	3·13	3·18	3·21

(a) No survey.

(b) January only.

TABLE 87
Value of Free Fresh Vegetables consumed by Urban Working-Class
Households 1945 and 1949

pence per head per week

	1945	1949
POTATOES		
First quarter	—	—
Second quarter	0·04	0·03
Third quarter	0·38	0·38
Fourth quarter	0·04	0·07
OTHER VEGETABLES		
First quarter	0·38	0·46
Second quarter	0·66	0·51
Third quarter	2·83	2·33
Fourth quarter	1·17	1·20

206. In the first part of Table 88 the value of free supplies of potatoes is expressed as a percentage of total supplies, purchased and free. The second part of the Table gives similar percentages for other fresh vegetables taken together with fresh fruit. During the third quarter of 1948, the value of free potatoes was as high as $8\frac{1}{2}$ per cent of the total. With the exception of this year, the contribution averaged annually from $1\frac{1}{2}$ to 2 per cent, as compared with 4 per cent for 1943 and $2\frac{1}{2}$ per cent for 1944. The annual average contribution of other vegetables and of fruit showed a similar fall (8 to 9 per cent) compared with the war-time levels (19 per cent in 1943 and 14 per cent in 1944) but still amounted to 11 to 14 per cent in the third quarter of each year.

TABLE 88

Value of Free Fruit and Fresh Vegetables consumed by Urban Working-Class Households

Expressed as percentage (a) of value of all such produce

	Potatoes (b)					Other fresh vegetables and fresh fruit				
	1945	1946	1947	1948	1949	1945	1946	1947	1948	1949
	%	%	%	%	%	%	%	%	%	%
First quarter ...	0	—	—	—	—	3.0	4.5	2.0	3.0(f)	2.5
Second quarter	0.5	—	—	0.5	—	7.5	6.5	6.0	7.0	6.0
Third quarter ...	5.0	4.0	4.5	8.5	4.0	15.0	11.5	14.0	13.5	14.0
Fourth quarter	0.5	1.0	(c)	1.0	1.0	10.0	6.5	(c)	5.5	8.0
Annual average	1.5	1.5	2.0(d)	3.0(e)	1.5	10.0	8.0	9.0(d)	9.0(e)	8.5

(a) Percentages are given to the nearest half per cent.

(b) Percentages are calculated as proportions of all potatoes, including chips.

(c) No survey.

(d) Nine months only.

(e) Ten months only.

(f) January only.

CEREALS

207. With the shortage of meat and of potatoes, and with the increased supplies of butter, the demand for bread increased even beyond the war-time level but drought in overseas countries and the move away from arable farming in the United Kingdom after the close of the war checked the increase in supplies. In order to meet this position it was necessary to raise the flour extraction rate still further: during February to May 1946 it was raised by stages from 80 per cent to 90 per cent and in September lowered again to 85 per cent. Supplies of flour were then maintained at more than 20 per cent above pre-war but were still inadequate to meet the expanded demand for bread so that rationing was at last introduced. From 1st July 1946 to 24th July 1948, bread and flour could only be purchased against bread "units" or coupons each representing 7 oz. of bread or similar quantities of flour. The weekly allowance for the normal adult was 9 units (63 oz.); children between the ages of four and eleven received the same allowance and those under four, 5 units (35 oz.); expectant mothers and woman manual workers were entitled to 11 units (77 oz.), adolescents (ages eleven to eighteen) 13 units (91 oz.) and male manual workers 15 units (105 oz.). For a short period during 1946 bread units were interchangeable with points coupons.

208. Weekly consumption per head of bread and flour, and of other cereal foods by urban working-class households 1945 to 1949 is shown in Table 89.

The records for 1945 represent the highest level of bread consumption reached during the war but after the war, following a small reduction in 1946, consumption rose even higher, reaching a peak of nearly 66 oz. in 1948. The level for 1949 (61 oz.) may be compared with that recorded by the Ministry of Labour before the war of 57 oz., but at that time flour consumption was given as nearly 19 oz. compared with the National Food Survey figure in 1949 of just under 7 oz. Thus there is little evidence of a return by the working-class to the pre-war use of flour in the home despite the resumption on the part of many housewives of full-time domestic duties and the slight alleviation of the shortage of fats and sugar. Consumption of breakfast cereals doubled during the post-war years, and that of cake, buns and scones declined slightly.

TABLE 89
Domestic Consumption of Bread, Flour and other Cereal Foods 1945-1949

oz. per head per week

	1945	1946	(d) 1947	(e) 1948	1949
Bread (a)	61.8	59.9	62.5	65.8	61.1
Flour	6.2	6.1	5.4	6.2	6.9
Biscuits (b)	2.9	2.6	2.2	2.6	2.9
Cakes, buns and scones ...	10.4	9.5	9.4	9.9	9.2
Oatmeal and oat products ...	1.3	1.3	1.2	1.3	1.2
Breakfast cereals	0.9	1.0	1.1	1.5	1.5
Other cereal foods (c)	2.0	2.1	2.1	2.5	2.6

(a) " Bread " includes rolls, breadcrumbs, currant and maltbread, muffins and crumpets.

(b) " Biscuits " include rusks and crispbread.

(c) " Other cereal foods " include rice, sago, tapioca, cornflour, and custard powder.

(d) Nine months' average.

(e) Ten months' average.

209. The nutritional contribution of bread and flour to the working-class diet during 1945 to 1949 is shown in Table 90 and a comparison with the position during the war is given in Table 91. Calories, protein and iron showed little change after the war, but the proportion of the total intake of calcium attributable to bread and flour almost doubled because of the increased fortification (from 7 oz. to 14 oz. per 280 lb.) from August 1946 onwards.

TABLE 90
Proportion of total Energy Value and Nutrients derived from Bread and Flour in Domestic Consumption 1945-1949

	1945	1946	1947	1948	1949
Energy value (Calories) ...	30.4	29.9	31.0	31.8	29.8
Protein	32.9	31.1	32.1	34.1	32.9
Fat	3.5	4.0	4.0	3.8	3.3
Calcium	20.0	23.3	30.6	31.8	29.6
Iron	29.9	34.0	31.5	33.8	33.8
Vitamin B ₁	35.4	40.0	41.5	42.7	41.2
Riboflavin	10.1	15.8	17.1	18.2	17.1
Nicotinic Acid	26.5	33.1	28.7	30.4	29.1

TABLE 91
Proportion of total Energy Value and Nutrients derived from Bread and Flour in Domestic Consumption 1946-1949 compared with 1942-1945

	Percentage of total intake averaged over	
	1942-1945	1946-1949
Energy value (Calories) ...	30.7	30.8
Protein	33.1	32.8
Fat	3.5	3.8
Calcium	16.5	28.8
Iron	32.7	33.4
Vitamin B ₁	37.8	41.5
Riboflavin	14.4	17.0
Nicotinic acid	26.7	30.3

SUGAR AND PRESERVES

210. Improvement in world supplies after the difficult days of 1945 and 1946, together with good home crops, made possible a steady increase in sugar consumption, but imports continued to be restricted by dollar shortage so that by 1949 working-class household consumption of sugar was still less than three-quarters of the pre-war level. It continued to be possible to exchange jam for sugar and with the derationing of certain varieties of jam in 1948 there was a tendency to exchange the remaining preserves entitlement for sugar. This option was withdrawn on the de-rationing of all preserves in December 1948 but consumption was maintained by increasing the ration from 8 oz. to 10 oz. It was reduced again in August 1949 to 8 oz.

211. With the resumption of imports, more fruit became available for the manufacture of jam preserves and between 1948 and 1949 production of jam and marmalade increased by about 7 per cent. By 1947, pre-emption of fruit for jam ceased and two years later, in 1949, all jams were taken off the ration. The effect of these changes is shown in Table 92. After having fallen from over 6 oz. in 1944 to 5½ oz. in 1945, consumption of preserves increased up to 1949, in which year the average consumption per head in working-class households had risen to 6½ oz. or about 25 per cent above the pre-war level.

TABLE 92
Domestic Consumption of Sugar and Preserves 1945-1949

	<i>oz. per head per week</i>				
	1945	1946	(d) 1947	(d) 1948	1949
SUGAR					
Consumption	9.13	9.55	10.15	10.20	10.85
Average level of ration (plus bonuses)	8.6	9.7	10.2	10.0	11.4
Maximum preserves option...	4.0	4.0	4.0	3.7	(e)
PRESERVES (a)					
Consumption	5.48	5.42	5.51	6.19	6.26
Purchases	4.28	4.47	4.46	5.03	5.21
Average level of ration (b) ...	5.8 (c)	4.3	4.3	4.3	(e)

(a) Jam, marmalade, syrup, treacle, mincemeat, fruit curd and honey.

(b) Excludes preserves on points.

(c) If 2 lb. marmalade taken in lieu of 1 lb. jam.

(d) Adjusted for seasonal trend.

(e) All jams, marmalade and fruit curd were derationed by the end of 1948.

Energy Value and Nutrient Composition of Diet 1945 to 1949

212. The food policy developed during the war years continued into the years of shortage that followed. By the end of the war, the consumption of all nutrients, with the exception of fat and vitamin A, had shown a steady improvement compared with the pre-war consumption, and that of calories and animal protein was close to pre-war levels. But the post-war world food shortage and with it the necessity during 1946 and until 1948 to ration flour and bread and later, during the winter 1947 and 1948 to control the distribution of potatoes,¹ caused difficulties. Their effect on the working-class diet is summarised above.² Further details are given in the following paragraphs.

ENERGY VALUE

213. According to Food Consumption Levels estimates, total energy value of the diet, which had regained the pre-war level in 1944, fell to 96 per cent of that level in 1947 to return to it again in 1949. These changes are reflected in the figures of energy value recorded for urban working-class diets in the Food Survey and analysed in Tables 93 and 94.

214. As in wartime, bread, flour and other cereals were the chief sources of energy so that when it was necessary to ration bread and flour in 1947, the year when more food was controlled than at any other time during or after the war, the proportions of calories from rationed foods rose to over 80 per cent. By 1949 this proportion had fallen again to the wartime level of 40 per cent. The smallest contribution of bread and flour to the energy value of the diet was in 1946, when the total value of the diet was 2,307 calories per person per day and the largest contribution in 1948 when the average was only a little higher (2,387 calories). During 1946 the fall in the share from bread and flour was partly offset by the consumption of more potatoes. The contribution from fats was least in 1947 but 1949 showed an abrupt rise, with the result that in 1949 the two chief forms of calories were cereals (40 per cent) and fats (14 per cent), all meats accounting for less than 10 per cent. During this year, fats, sugar, preserves and milk each contributed more calories, and bread and flour less than in the previous year. By then cereals were unrationed so that, although meat was contributing fewer calories, the palatability of the diet was improving.

¹ See paragraphs 157 to 168 above.

² See paragraphs 174 to 178 above.

TABLE 93
Energy Value of Domestic Food Consumption 1945-1949

Cal. per head per day

	1945		1946		1947		1948		1949	
		% of total		% of total		% of total		% of total		% of total
Bread and flour	721	30.4	690	29.9	716	31.0	759	31.8	723	29.8
Other cereal products ...	247	10.4	232	10.1	223	9.7	245	10.3	244	10.1
		40.8		40.0		40.7		42.1		39.9
Fats	281	11.8	263	11.4	250	10.8	280	11.7	343	14.1
Sugars and preserves ...	197	8.3	203	8.8	213	9.2	226	9.5	233	9.6
Meat, rationed (including bacon)	221	9.3	199	8.6	185	8.0	158	6.6	159	6.6
Meat, other	75	3.2	71	3.1	72	3.1	71	3.0	65	2.7
		12.5		11.7		11.1		9.6		9.3
Potatoes, including chips ...	184	7.7	197	8.5	193	8.4	191	8.0	189	7.8
Other vegetables and fruit ...	71	3.0	68	2.9	73	3.2	70	2.9	75	3.1
		10.7		11.4		11.6		10.9		10.9
Milk	225	9.5	220	9.6	225	9.7	229	9.6	246	10.1
Other foods	153	6.4	164	7.1	158	6.9	158	6.6	148	6.1
Total	2,375	100.0	2,307	100.0	2,308	100.0	2,387	100.0	2,425	100.0

TABLE 94

Energy Value derived from Rationed and Unrationed Foods 1945-1949

Cal. per head per day

	1945	1946	1947	1948	1949
RATIONED FOODS					
By weight or value	694	664	647	642	670
Points foods	173	180	188	127	121
Milk and eggs	249	231	225	245	263
"Bread unit" foods	—	391(a)	830	436(a)	—
	— 1,116	— 1,466	— 1,890	— 1,450	— 1,054
UNRATIONED FOODS	1,259	841	418	937	1,371
Total	2,375	2,307	2,308	2,387	2,425

(a) The total "bread unit" foods consumed during the last two quarters of 1946 and the first two quarters of 1948 are assumed to be rationed.

PROTEIN

215. Estimated supplies of *animal* protein, which had almost reached the pre-war level in 1945, rose to above that level in 1946 and 1947. In these years the supply of *total* protein for civilian consumption was more plentiful than at any time since the beginning of the war. By 1949, animal protein had fallen to the 1945 level and the total supply of protein was slightly less. Similar trends were recorded in working-class diets (Table 95). Animal protein consumption reached the maximum recorded by the National Food Survey in 1946, and that for 1947 equalled the wartime maximum of 1944, meat and fish assisting in this improvement in the early post-war years, the contribution from eggs being less after 1945. Later, the supply from meat and fish diminished and milk provided partial compensation only for this reduction so that by 1949 the total protein content of the working-class household diet had returned to the 1945 level. Vegetable protein accounted for 53 to 56 per cent of the total during these years, bread and flour and other cereal products contributing 39 to 43 per cent. In 1947, when bread was rationed, the proportion of total protein in the diet supplied by rationed foods was as much as 75 per cent and in 1949 less than 40 per cent.

TABLE 95
Protein Content of Domestic Food Consumption 1945-1949

g. per head per day

	1945		1946		1947		1948		1949	
		% of total		% of total		% of total		% of total		% of total
ANIMAL PROTEIN										
Milk	12	15.8	12	15.4	12	15.6	12	15.6	13	17.1
Cheese	2	2.6	3	3.8	2	2.6	2	2.6	2	2.6
		—18.4		—19.2		—18.2		—18.2		—19.7
Meats	14	18.4	15	19.2	15	19.5	13	16.9	13	17.1
Fish	4	5.3	5	6.4	5	6.5	5	6.5	4	5.3
Eggs	3	3.9	2	2.6	2	2.6	2	2.6	2	2.6
Total animal protein	35	46.0	37	47.4	36	46.8	34	44.2	34	44.7
VEGETABLE PROTEIN										
Bread and flour	25	32.9	24	31.1	25	32.1	26	34.1	25	32.9
Other cereal products ...	6	7.9	6	7.4	6	8.1	7	8.7	6	7.9
		—40.8		—38.5		—40.2		—42.8		—40.8
Potatoes and vegetables ...	8	10.6	8	10.3	8	10.4	8	10.4	8	10.6
Other foods ...	2	2.6	3	3.8	2	2.6	2	2.6	3	3.9
Total vegetable protein ...	41	54.0	41	52.6	41	53.2	43	55.8	42	55.3
Total protein ...	76	100.0	78	100.0	77	100.0	77	100.0	76	100.0

TABLE 96
Protein derived from Rationed and Unrationed Foods 1945-1949

g. per head per day

	1945	1946	1947	1948	1949
RATIONED FOODS					
By weight or value	12	14	13	11	11
Points foods	5	7	7	4	3
Milk and eggs	15	13	12	13	15
"Bread unit" foods	—	14(a)	28	15(a)	—
	—32	—48	—60	—43	—29
UNRATIONED FOODS	44	30	17	34	47
Total	76	78	77	77	76

(a) See footnote to Table 94.

FAT

216. Fat was the nutrient most seriously affected by post-war shortages and it is estimated that total supplies for civilian consumption fell in 1947 to a level as low as 81 per cent of the pre-war figure. Thereafter, a gradual improvement was experienced until, at the end of 1949, total estimated supplies stood at 91 per cent of the quantities available before the war. Table 97 shows that the total quantity of fat recorded by the Survey for working-class households reached a minimum in 1947, the diet being probably the poorest, so far as palatability is concerned, experienced during the post-war years. As flour and bread contain very little fat the proportions obtained from rationed and

unrationed sources were little affected by bread rationing and remained similar to those prevailing during the war (Table 98), rationed foods providing nearly three-quarters of the total.

TABLE 97
Fat Content of Domestic Food Consumption 1945-1949

g. per head per day

	1945		1946		1947		1948		1949	
		% of total		% of total		% of total		% of total		% of total
Fats (a)	31	33.7	29	33.7	28	34.2	31	35.2	38	40.0
Meats	26	28.2	22	25.6	23	28.0	21	23.8	19	20.0
Milk and other dairy produce	18	19.6	17	19.8	17	20.7	18	20.5	19	20.0
Other foods	17	18.5	18	20.9	14	17.1	18	20.5	19	20.0
Total	92	100.0	86	100.0	82	100.0	88	100.0	95	100.0

(a) Butter, margarine, cooking fats and edible oils.

TABLE 98
Fat derived from Rationed and Unrationed Foods 1945-1949

per head per day

	1945	1946	1947	1948	1949
RATIONED FOODS					
By weight or value	52	47	44	48	55
Points foods	6	6	5	7	3
Milk and eggs	15	13	13	14	15
"Bread unit" foods	—	4(a)	7	2(a)	—
	— 73	— 70	— 69	— 71	— 73
UNRATIONED FOODS	19	16	13	17	22
Total	92	86	82	88	95

(a) see footnote to Table 94.

CALCIUM

217. Supplies of calcium steadily increased during the post-war years, firstly because liquid milk became increasingly plentiful particularly after 1947 and secondly, because of the increase of 7 oz. of calcium carbonate (to a total of 14 oz.) in the quantity added to each 280 lb. sack of flour, made when the extraction rate of flour was raised to 90 per cent in August 1946. These changes caused successive rises in the Food Consumption Levels estimates of calcium supplies during 1946 and 1947 to reach 75 per cent above the pre-war level in 1949.

218. The urban working-class diet (Table 99) after providing slightly less calcium in 1946 than in 1945, contained an increasing quantity from that year onwards, the rise being most marked in 1949. Before 1947, bread and flour contributed less than half as much calcium to the total diet as milk, but after the increased fortification had become fully effective the proportion rose to about three-quarters. Since the additional contribution of calcium from milk during the post-war years was largely offset by the fall in the cheese and vegetable contribution, the improvement in calcium supplies was a result chiefly of the additional fortification of bread. Table 100 shows that nearly 90 per cent of the calcium in the diet of 1947 was obtained from rationed foods, which then included bread and flour. This proportion fell to just over 50 per cent in 1949.

TABLE 99
Calcium Content of Domestic Food Consumption 1945-1949

mg. per head per day

	1945		1946		1947		1948		1949	
		% of total		% of total		% of total		% of total		% of total
Milk	430	49.1	420	46.0	422	42.4	428	42.4	457	44.4
Cheese	81	9.3	83	9.1	74	7.4	64	6.3	69	6.7
		58.4		55.1		49.8		48.7		51.1
Bread and flour	175	20.0	212	23.3	304	30.6	322	31.8	305	29.6
Other cereal products	41	4.7	51	5.6	58	5.8	63	6.2	63	6.1
		24.7		28.9		36.4		38.0		35.7
Vegetables	73	8.3	72	7.9	64	6.4	63	6.2	64	6.2
Eggs	12	1.4	10	1.1	9	0.9	10	1.0	13	1.3
Other foods	63	7.2	64	7.0	65	6.5	62	6.1	59	5.7
Total	875	100.0	912	100.0	996	100.0	1,012	100.0	1,030	100.0

TABLE 100
Calcium derived from Rationed and Unrationed Foods 1945-1949

mg. per head per day

	1945	1946	1947	1948	1949
RATIONED FOODS					
By weight or value	92	94	85	73	76
Points foods	51	62	67	37	41
Milk and eggs	430	408	401	423	452
"Bread unit" foods	—	143(a)	342	145(a)	—
	— 573	— 707	— 895	— 678	— 569
UNRATIONED FOODS	302	205	101	334	461
Total	875	912	996	1,012	1,030

(a) See footnote to Table 94.

IRON

219. The supply estimates of iron show a peak level for 1946. The principal reason for this was the change in the extraction rate of flour to 90 per cent in August, bread and flour providing more iron during that year than during any other year. By 1949 the supply had fallen again but still represented a 25 per cent increase above pre-war level. During the post-war years the iron content of the working-class diet was higher on the average than during the war years, although in 1949 there was some decline. This was largely attributable to the fall in meat consumption, particularly since 1947 when the large quantity of canned corned meat included in the ration resulted in the highest contribution of iron from meat recorded by the Survey. As with a number of other nutrients, the proportion of iron obtained from rationed foods (Table 102) reached its maximum (over 70 per cent) in 1947, in this instance because of the large contribution from meat that year and the rationing of bread and flour. With the derationing of bread and flour and the reduction in the quantity of canned meat distributed on points, the contribution of iron from rationed foods in 1949 fell to 25 per cent of the total. Urban working-class diets during these years showed clearly the effect of the flour extraction rate upon the consumption of iron (Table 101). In 1946 a maximum figure was recorded, and although the consumption of bread and flour was the same in 1945, when the extraction rate was 80 per cent as in 1947, the effect of an 85 per cent extraction rate in the latter year was to raise the consumption from bread and flour by 0.7 mg. per head per day.

TABLE 101
Iron Content of Domestic Food Consumption 1945-1949

mg. per head per day

	1945		1946		1947		1948		1949	
		% of total		% of total		% of total		% of total		% of total
Bread and flour	3.8	29.9	4.9	34.0	4.5	31.5	4.8	33.8	4.6	33.8
Other cereal products... ..	1.3	10.2	1.4	9.7	1.4	9.8	1.6	11.3	1.5	11.0
		— 40.1		— 43.7		— 41.3		— 45.1		— 44.8
Meat, rationed (including bacon)	1.9	15.0	2.2	15.3	2.5	17.5	1.9	13.4	1.7	12.5
Meat, other	0.8	6.3	1.0	6.9	1.3	9.1	1.2	8.4	0.9	6.6
		— 21.3		— 22.2		— 26.6		— 21.8		— 19.1
Vegetables	2.5	19.7	2.5	17.4	2.4	16.8	2.4	16.9	2.4	17.7
Eggs	0.6	4.7	0.5	3.5	0.5	3.5	0.5	3.5	0.6	4.4
Other foods	1.8	14.2	1.9	13.2	1.7	11.8	1.8	12.7	1.9	14.0
Total	12.7	100.0	14.4	100.0	14.3	100.0	14.2	100.0	13.6	100.0

TABLE 102
Iron derived from Rationed and Unrationed Foods 1945-1949

mg. per head per day

	1945	1946	1947	1948	1949
RATIONED FOODS					
By weight or value	2.0	2.4	2.5	1.9	1.8
Points foods	1.5	1.7	1.8	1.0	0.7
Milk and eggs	1.0	0.8	0.7	0.8	1.0
"Bread unit" foods	—	3.0(a)	5.2	2.7(a)	—
	— 4.5	— 7.9	— 10.2	— 6.4	— 3.5
UNRATIONED FOODS	8.2	6.5	4.1	7.8	10.1
Total	12.7	14.4	14.3	14.2	13.6

(a) See footnote to Table 94.

VITAMIN A

220. Supplies of vitamin A for civilian consumption are estimated to have more than regained their pre-war level in 1948 and, from Table 103, working-class domestic consumption is shown as increasing that year to over 20 per cent above that of 1945. In 1949 the sharp drop in the vitamin A obtained from root vegetables (chiefly carrots), was balanced first by an increased quantity from fats; since vitamin A from fats and other animal products is more readily absorbed by human beings than the β -carotene from vegetable products, the improvement in 1949 may have been greater than the figures in the Table suggest. Further, the contribution of vitamin A from meats (particularly liver) other than rationed meats and that from eggs and milk had increased in 1949 compared with 1946. During the post-war period the proportion of this vitamin obtained from rationed foods remained constant at about 50 per cent with a slight rise in 1949 due to the smaller supply from root vegetables.

TABLE 103
Vitamin A Content of Domestic Food Consumption 1945-1949 (a)

i.u. per head per day

	1945		1946		1947		1948		1949	
		% of total		% of total		% of total		% of total		% of total
Root vegetables	800	27.5	737	25.2	645	22.0	713	22.7	588	18.7
Other vegetables	214	7.4	216	7.4	204	7.0	201	6.4	189	6.0
		— 34.9		— 32.6		— 29.0		— 29.1		— 24.7
Fats	690	23.7	742	25.4	747	25.5	829	26.3	882	28.0
Milk	386	13.3	380	13.0	388	13.2	436	13.9	432	13.7
Cheese	129	4.4	134	4.5	119	4.1	103	3.3	113	3.6
		— 17.7		— 17.5		— 17.3		— 17.2		— 17.3
Meat, rationed (including bacon)	24	0.8	25	0.9	24	0.8	22	0.7	21	0.7
Meat, other	344	11.8	381	13.0	410	14.0	439	14.0	459	14.6
		— 12.6		— 13.9		— 14.8		— 14.7		— 15.3
Eggs	182	6.3	156	5.3	149	5.1	163	5.2	208	6.6
Other foods	139	4.8	155	5.3	243	8.3	237	7.5	254	8.1
Total	2,908	100.0	2,926	100.0	2,929	100.0	3,143	100.0	3,146	100.0

(a) Excluding Vitamin Welfare Foods.

TABLE 104
Vitamin A derived from Rationed and Unrationed Foods 1945-1949

i.u. per head per day

	1945	1946	1947	1948	1949
RATIONED FOODS (a)					
By weight or value	842	900	889	950	1,009
Points foods	46	76	107	54	56
Milk and eggs	564	501	484	560	615
	1,452	1,477	1,480	1,564	1,680
UNRATIONED FOODS	1,456	1,449	1,449	1,579	1,466
Total	2,908	2,926	2,929	3,143	3,146

(a) "Bread Unit" foods provided negligible quantities of Vitamin A.

VITAMIN B₁

221. Estimated civilian supplies of vitamin B₁ remained fairly constant during the post-war years at about the 1945 level, or an increase of 50 per cent above that obtaining before the war. The post-war supply was affected chiefly by the extraction rate of flour. Comparing the contribution to the working-class household diet in 1945, 1947 and 1949 a difference of 0.11 mg. a day is found to result from increasing the extraction rate from 80 to 85 per cent. Since the quantity of bread eaten was least in 1946, when the extraction rate was as high as 90 per cent, the effect of this high rate on consumption was less marked. Nevertheless, the contribution of the vitamin from cereals was much higher during 1946 to 1949 compared with 1945, and accounted for nearly one-half of the total consumption in 1949. The contribution from meat suffered a corresponding decline so that the total that year was only slightly above that in 1945. Eleven per cent from milk in 1949 represented the largest proportion recorded for that food. On account of the rationing of bread and flour two-thirds of the total supply of vitamin B₁ was attributable to rationed foods in 1947, and the proportion dropped to one-fifth in 1949.

TABLE 105
Vitamin B₁ Content of Domestic Food Consumption 1945-1949

mg. per head per day

	1945		1946		1947		1948		1949	
		% of total		% of total		% of total		% of total		% of total
Bread and flour	0.52	35.4	0.62	40.0	0.63	41.5	0.67	42.7	0.63	41.2
Other cereal products	0.08	5.4	0.09	5.8	0.09	5.9	0.10	6.4	0.09	5.9
		40.8		45.8		47.4		49.1		47.1
Potatoes	0.28	19.1	0.31	20.0	0.30	19.7	0.29	18.4	0.28	18.3
Other vegetables	0.10	6.8	0.10	6.5	0.09	5.9	0.10	6.4	0.10	6.5
		25.9		26.5		25.6		24.8		24.8
Meats	0.25	17.0	0.19	12.3	0.18	11.9	0.16	10.2	0.16	10.5
Milk	0.16	10.9	0.16	10.3	0.16	10.5	0.16	10.2	0.17	11.1
Other foods	0.08	5.4	0.08	5.1	0.07	4.6	0.09	5.7	0.10	6.5
Total	1.47	100.0	1.55	100.0	1.52	100.0	1.57	100.0	1.53	100.0

TABLE 106

Vitamin B₁ derived from Rationed and Unrationed Foods 1945-1949*mg. per head per day*

	1945	1946	1947	1948	1949
RATIONED FOODS					
By weight or value	0.17	0.14	0.10	0.09	0.11
Points foods	0.10	0.10	0.10	0.04	0.03
Milk and eggs	0.18	0.17	0.16	0.18	0.19
"Bread unit" foods	—	0.34 ^(a)	0.68	0.29 ^(a)	—
	— 0.45	— 0.75	— 1.04	— 0.60	— 0.33
UNRATIONED FOODS	1.02	0.80	0.48	0.97	1.20
Total	1.47	1.55	1.52	1.57	1.53

(a) See footnote to Table 94.

RIBOFLAVIN

222. Estimated civilian supplies of riboflavin showed little change after the end of the war and remained at a level of about 25 per cent above that of pre-war. Similarly the recorded consumption of working-class households varied little, milk and particularly bread and flour providing additional quantities offsetting the diminished contribution from meat and vegetables. In 1949 milk supplied one-third and bread and flour one-sixth of total consumption. A larger proportion of riboflavin than of other vitamins was supplied by rationed foods. In 1947 when bread and flour were rationed the proportion was 75 per cent ; later it fell to 60 per cent.

TABLE 107
Riboflavin Content of Domestic Food Consumption 1945-1949

mg. per head per day

	1945		1946		1947		1948		1949	
		% of total		% of total		% of total		% of total		% of total
Milk	0.57	36.1	0.55	33.3	0.56	34.2	0.56	33.9	0.58	35.4
Cheese	0.05	3.2	0.05	3.0	0.05	3.0	0.04	2.4	0.04	2.4
		— 39.3		— 36.3		— 37.2		— 36.3		— 37.8
Meats	0.25	15.8	0.25	15.1	0.23	14.0	0.24	14.6	0.23	14.0
Vegetables	0.25	15.8	0.24	14.6	0.23	14.0	0.22	13.3	0.18	11.0
Bread and flour	0.16	10.1	0.26	15.8	0.28	17.1	0.30	18.2	0.28	17.1
Other cereal products ...	0.04	2.5	0.05	3.0	0.05	3.0	0.06	3.6	0.06	3.7
		— 12.6		— 18.8		— 20.1		— 21.8		— 20.8
Eggs	0.10	6.4	0.07	4.3	0.07	4.3	0.08	4.9	0.10	6.1
Other foods	0.16	10.1	0.18	10.9	0.17	10.4	0.15	9.1	0.17	10.3
Total	1.58	100.0	1.65	100.0	1.64	100.0	1.65	100.0	1.64	100.0

TABLE 108
Riboflavin derived from Rationed and Unrationed Foods 1945-1949

mg. per head per day

	1945	1946	1947	1948	1949
RATIONED FOODS					
By weight or value	0.19	0.28	0.26	0.23	0.23
Points foods	0.09	0.10	0.11	0.06	0.06
Milk and eggs	0.66	0.59	0.58	0.62	0.65
"Bread unit" foods	—	0.15(a)	0.30	0.13(a)	—
	— 0.94	— 1.12	— 1.25	— 1.04	— 0.94
UNRATIONED FOODS	0.64	0.53	0.39	0.61	0.70
Total	1.58	1.65	1.64	1.65	1.64

(a) See footnote to Table 94.

NICOTINIC ACID

223. In 1945, estimated supplies of nicotinic acid were about 10 per cent more than before the war and remained at about this level during the post-war period with the exception of 1946 when they reached a peak of 27 per cent. These changes were paralleled in the working-class household diet. The reason for the high level reached in 1946 was the high extraction rate of flour: flour at the 90 per cent rate then introduced contains about twice as much nicotinic acid as flour at the 85 per cent rate. In 1945 meat supplied slightly more nicotinic acid than bread and other cereal products but from 1946 onwards the contribution from meat declined while that from cereals increased, so that by 1949 their relative positions had changed. This, and the change from fish to margarine for vitamin D, are the two main examples shown by the Food Survey of one food or group of foods (in this case cereals) replacing another (meats) as the chief source of a nutrient. The importance of cereals as a source of supply meant that in 1947 over 60 per cent of this vitamin was obtained from rationed foods, a proportion that fell to 25 per cent in 1949.

TABLE 109
Nicotinic Acid Content of Domestic Food Consumption 1945-1949

mg. per head per day

	1945		1946		1947		1948		1949	
		% of total		% of total		% of total		% of total		% of total
Meat, rationed (including bacon)	3.0	22.7	2.9	20.0	2.7	20.9	2.4	18.8	2.4	18.9
Meat, other	1.3	9.9	1.1	7.6	1.3	10.1	1.2	9.4	1.2	9.5
		32.6		27.6		31.0		28.2		28.4
Bread and flour	3.5	26.5	4.8	33.1	3.7	28.7	3.9	30.4	3.7	29.1
Other cereals products	0.6	4.5	0.7	4.8	0.6	4.6	0.6	4.7	0.7	5.5
		31.0		37.9		33.3		35.1		34.6
Vegetables	3.2	24.2	3.1	21.4	3.0	23.3	2.9	22.6	2.8	22.0
Fish	0.8	6.1	0.9	6.2	0.8	6.2	0.8	6.3	0.6	4.8
Other foods	0.8	6.1	1.0	6.9	0.8	6.2	1.0	7.8	1.3	10.2
Total	13.2	100.0	14.5	100.0	12.9	100.0	12.8	100.0	12.7	100.0

TABLE 110
Nicotinic acid derived from Rationed and Unrationed Food 1945-1949

mg. per head per day

	1945	1946	1947	1948	1949
RATIONED FOODS					
By weight or value	3.0	3.0	2.7	2.4	2.4
Points foods	0.9	0.9	0.8	0.4	0.4
Milk and eggs	0.4	0.4	0.4	0.4	0.4
"Bread unit" foods	—	2.8(a)	3.9	1.6(a)	—
	— 4.3	— 7.1	— 7.8	— 4.8	— 3.2
UNRATIONED FOODS	8.9	7.4	5.1	8.0	9.5
Total	13.2	14.5	12.9	12.8	12.7

(a) See footnote to Table 94.

VITAMIN C

224. Because of more plentiful supplies of fruit in the post-war years, supplies of vitamin C, which were estimated at 10 per cent above pre-war in 1945, almost reached 15 per cent above that level by 1948, but declined again in 1949. From 1945 to 1949 urban working-class diets showed an increased consumption of 13 per cent, after allowance is made for cooking losses.¹ From Table 112, which allows for cooking losses, it will be seen that the contribution of potatoes fell from 42 per cent to 39 per cent between 1945 and 1949, fruit increased from 21 per cent to 31 per cent, and green vegetables declined from 19 per cent to 12 per cent. In 1949, as a result of these changes, potatoes and fruit accounted each for about one-third of total supplied of vitamin C, and green vegetables for less than one-tenth. Nearly all the vitamin C came from unrationed sources; potatoes being rationed for a period only of 1947 and of 1948 have not been included in the category of rationed foods for these years.

TABLE 111
Vitamin C Content of Domestic Food Consumption 1945-1949 (a)

No allowance made for cooking losses

mg. per head per day

	1945		1946		1947		1948		1949	
		% of total		% of total		% of total		% of total		% of total
Potatoes	36	41.9	38	42.7	33	42.8	43	44.8	38	42.2
Green vegetables	30	34.9	30	33.7	18	23.4	27	28.1	25	27.8
Fruit	9	10.5	9	10.1	14	18.2	14	14.6	15	16.7
Other vegetables	7	8.1	8	9.0	8	10.4	8	8.3	7	7.8
Other foods	4	4.6	4	4.5	4	5.2	4	4.2	5	5.5
Total	86	100.0	89	100.0	77	100.0	96	100.0	90	100.0

(a) Excluding Vitamin Welfare Foods.

¹ See paragraph 152 above.

TABLE 112
Vitamin C Content of Domestic Food Consumption 1945-1949 (a)

Allowing for cooking losses

mg. per head per day

	1945		1946		1947		1948		1949	
		% of total		% of total		% of total		% of total		% of total
Potatoes	18	41.9	19	43.2	17	38.6	22	43.1	19	38.8
Fruit	9	20.9	9	20.4	14	31.8	14	27.4	15	30.6
Green vegetables	8	18.6	8	18.2	5	11.4	7	13.7	6	12.2
Other vegetables	4	9.3	4	9.1	4	9.1	4	7.9	4	8.2
Other foods	4	9.3	4	9.1	4	9.1	4	7.9	5	10.2
Total	43	100.0	44	100.0	44	100.0	51	100.0	49	100.0

(a) Excluding Vitamin Welfare Foods.

TABLE 113
Vitamin C derived from Rationed and Unrationed Food (a) 1945-1949

No allowance made for cooking losses

mg. per head per day

	1945	1946	1947	1948	1949
RATIONED FOODS					
By weight or value	1	1	1	1	0
Points foods	0	1	1	1	1
Milk and eggs	4	3	3	3	4
	— 5	— 5	— 5	— 5	— 5
UNRATIONED FOODS	81	84	72	91	85
Total	86	89	77	96	90

(a) Excluding Vitamin Welfare Foods.

VITAMIN D

225. No estimate is available of the total supplies of vitamin D available for civilian consumption. For the working-class household diet fatty fish was, apart from vitamin A and D tablets and cod liver oil, the richest source up to 1949, providing about half the vitamin D in the household diet. But in 1949 consumption of fish fell and that of fortified margarine¹ and butter rose with the result that margarine instead of fish became, for the first time, the chief source of vitamin D, supplying with butter half of the total intake. As noted in paragraph 223, this is one of the two cases where the chief source of a nutrient has changed during the period covered by the National Food Survey.

226. During the post-war years, between 50 and 65 per cent of the vitamin D in the diet was derived from rationed foods. This compares with proportions lying between 65 and 80 per cent during the war. The major reason for this change was the decrease in the supplies of canned fatty fish after the war. It is seen from Table 115 that in 1945 over 20 per cent of the total vitamin D was derived from points rationed foods, largely from canned fatty fish, but in 1949 only 7 per cent came from this source.

¹ Fortified with 90 i.u. of vitamin D per oz.

TABLE 114
Vitamin D Content of Domestic Food Consumption 1945-1949 (a)

i.u. per head per day

	1945		1946		1947		1948		1949	
		% of total		% of total		% of total		% of total		% of total
Fish	65	45.5	70	51.1	59	47.2	66	47.2	49	37.7
Margarine	55	38.4	45	32.8	43	34.4	51	36.4	54	41.5
Butter	5	3.5	7	5.1	8	6.4	8	5.7	9	6.9
Eggs	13	41.9	10	37.9	10	40.8	10	42.1	13	48.4
Other foods	5	9.1	5	7.3	5	8.0	5	7.2	5	10.0
		3.5		3.7		4.0		3.5		3.9
Total	143	100.0	137	100.0	125	100.0	140	100.0	130	100.0

(a) Excluding Vitamin Welfare Foods.

TABLE 115
Vitamin D derived from Rationed and Unrationed Foods 1945-1949 (a)

i.u. per head per day

	1945	1946	1947	1948	1949
RATIONED FOODS (b)					
By weight or value	62	53	51	59	64
Points foods	30	24	19	12	9
Milk and eggs	16	12	11	12	16
	— 108	— 89	— 81	— 83	— 89
UNRATIONED FOODS	35	48	44	57	41
Total	143	137	125	140	130

(a) Excluding Vitamin Welfare Foods.

(b) " Bread unit " foods provided negligible quantities of Vitamin D.

APPENDIX A

Methods and Reliability of the National Food Survey

Origin of the Survey

1. The Ministry of Food began the collection of records of food purchases and expenditure from samples of households in different parts of the country in July 1940. During that month about 1,500 records were obtained from working-class households in seven towns¹ and one rural area. In October, a further survey was made with the intention of collecting budgets from the same households as were surveyed in July, but this was possible for two-thirds only of the original informants.

2. As food supplies became more difficult and rationing increased in extent it was felt that the survey method should be developed to provide a continuous check on the nutrition of critical sections of the population. It was decided that, beginning in 1941, the Ministry of Food should carry out a regular quarterly survey, designed as far as possible to represent working-class households in the main urban areas. Work in rural areas was abandoned because of the difficulties of obtaining trained investigators to work in these areas during wartime.

3. During the first quarter of 1941, the Survey was conducted in seven towns, to which a further four¹ were added for the second and subsequent quarters. The number of households surveyed was approximately 1,000 in the first quarter, and between 1,400 and 1,500 in the remaining quarters. Within each town a random selection of addresses was taken from the electoral register of wards known to be predominantly working-class in character. It was still hoped to obtain budgets from the same household in successive surveys but about 35 per cent only of the original households completed records throughout the year and the idea of a constant panel to be visited at regular intervals was finally abandoned in 1943.²

4. The choice of towns included initially in the Survey was limited by the scarcity of trained investigators and, on a number of occasions, severe air-raids forced the postponement or the abandonment of the work. The effect on the Survey results of these and other disturbing factors, such as evacuation and mobilisation, are noted in the text of the Report³ but by the beginning of 1942 many of the initial fieldwork difficulties had been overcome and many improvements were made in the methods of investigation: the measurement of household food stocks was introduced to make possible an assessment of the quantities of foods consumed as well as those purchased; the size of the sample was enlarged; provision was made for the study of special groups of the population, such as households dependent on pensions and service allowances and heavy workers' households, and the fieldwork was made continuous.

5. During 1942, the results of the Survey were tabulated in five periods of ten weeks corresponding with the cycles of fieldwork. With an improvement in tabulating facilities, introduced at the beginning of 1943, regular monthly tabulations were possible and were continued to the end of 1949 with the exception of five months during the winter of 1947 to 1948, when certain special investigations were carried out in the place of the survey of working-class households.

Selection of the Sample

6. The following section describes the methods of selecting the sample during the time, from the beginning of 1942 up to the end of 1949, when the continuous survey was in operation. During 1950, when the Survey was further extended to cover all classes of the population, in both urban and rural areas, the third month in each quarter was omitted.

¹ See paragraph 32 above.

² See paragraph 52 above.

³ See paragraph 7 above.

7. The unit of the sample was the household since this is the catering unit for food. Food consumed at hotels, restaurants and similar catering establishments, and in institutions, was thus excluded but food prepared in the home to be eaten outside was treated as domestic food consumption.¹ Up to and including 1942, the members of the household were defined as those present during at least four days of the survey week. From 1943 onwards the definition was more precisely related to food consumption, a member of the household being defined as one who had consumed at least 16 meals provided by the housewife during the survey week, or proportionately less if the meal pattern was less than four a day. The effect of this definition is discussed in paragraphs 24 and 25 below.

8. The list of households was obtained first by selecting a number of towns, including all the great conurbations, attention being paid both to the size of the town and the character of the region in which it was located. The main limiting factor still continued to be the number of fieldworkers available and their mobility, so that, for example, adequate weight could not be given to the smaller towns.² Within the chosen towns a further selection was made of the wards or areas to be sampled. The choice of wards was, until the beginning of 1944, confined to those consisting predominantly of working-class residential areas, but from 1944 until 1948 areas of mixed middle and working-class character were also included and the households taking part in the Survey were assigned to the middle or working-class sample according to the occupation of the head of the household and the type of amenities enjoyed by the household. During 1949, a working-class sample only was drawn.

9. Within the selected wards, a random selection of addresses was made by choosing every 35th address from the Register of Electors (in England and Wales) or from the Valuation Rolls or survey books kept by each city or burgh (in Scotland). Until the new Electoral Registers became available in 1945, the 1939 lists had to be used. These were often out of date in the war years but they had the advantage that the head of the household and his wife were indicated by special symbols. In the new lists the identity of the head of household was not indicated.

10. The selected addresses were afterwards plotted on large scale maps and divided into groups of ten, each group being chosen to fall within as compact an area as possible. These sets of ten names and addresses were sent out to the fieldworkers and, at the same time, an introductory letter from the Ministry posted to the housewives explaining the method and purpose of the Survey and requesting their co-operation. At each address visited by the fieldworkers, only one household (catering unit) was asked to co-operate. For this reason, households which shared a single address (for example a house converted into 2 or 3 flats but not shown as such in the Electoral Register) were slightly under-represented. The process of selection was continued until the whole Register for the particular ward was exhausted, and the procedure repeated with other wards of similar type in the same town. When all the suitable wards had been sampled, a new town of similar character was selected in which to draw further samples.

11. During 1949 the National Food Survey was conducted in the following towns:

<i>Region</i>	<i>Town</i>	<i>Region</i>	<i>Town</i>
<i>Scotland ...</i>	Glasgow		Darlington
	Barrhead		Sheffield
	Edinburgh		Newcastle
	Kilmarnock		North Shields
	Airdrie	<i>North-Western ...</i>	Manchester
	Dumbarton		Liverpool
<i>North-Eastern ...</i>	Leeds		Bolton
	Huddersfield		Wigan
	Bradford		Accrington
	Hebburn		Crewe
	Jarrow		Oswaldtwistle
	Hartlepool		Church
	Ashington		

¹ Certain items of food which may have been eaten in the home were also omitted. See above, paragraph 4, page 1.

² See paragraph 31 below.

<i>Region</i>	<i>Town</i>	<i>Town</i>	
<i>Midlands...</i>	...	Birmingham	Battersea
		Stoke	Hampstead
		Derby	Kingsbury
		Chesterfield	Leyton
		Kettering	Croydon
		Leamington Spa	Uxbridge
		Shrewsbury	West Drayton and
		Worksop	Yiewsley
		Nottingham	Willesden
		Worcester	Southampton
	<i>South-Western ...</i>	...	Bristol	Worthing
		Torquay	Ipswich
		Saltash	Lowestoft
		Bridgend	High Wycombe
		Liskeard	Welwyn Garden City
		Tavistock	Chatham
		Plymouth	Tring
		Gloucester	Harpenden
		Taffswell	Portsmouth
		Pontypridd	St. Albans
		Cardiff	Huntingdon
<i>London and South-Eastern ...</i>	...	Chelsea	Godmanchester
		Deptford	Bedford
		Islington	Brighton
		Fulham	Slough
		Greenwich	Newbury
		Wandsworth	Gillingham
		Paddington	Harwich

Fieldwork : A. Placing the Log-book

12. The fieldwork was carried out by about 40 women investigators employed by the agency undertaking the fieldwork and editing the returns on behalf of the Ministry. The investigators worked in cycles of ten days, attempting to obtain from ten households completed log-books covering a period of a week. In practice, the average number of households which each investigator succeeded in covering during a cycle was about eight. Half the investigators worked a 10-day cycle beginning on a Monday, half a similar cycle beginning on a Thursday. The programme for a cycle beginning on a Monday was as follows:—

- Monday ... First call ; stock-weighing for addresses 1-5 on the list.
- Tuesday ... First call ; stock-weighing for addresses 6-10 on the list.
- Wednesday ... Recall on 1-5 ; replacement where necessary.
- Thursday ... Recall on 6-10.
- Friday ... Further recall on 1-5.
- Saturday ... Further recall on 6-10.
- Monday ... Final call ; stock-weighing 1-5.
- Tuesday ... Final call ; stock-weighing 6-10.
- Wednesday ... Final calls on late replacements and settling of queries.

Similarly, the cycle which began on a Thursday ended on the Saturday ten days later, so that each investigator worked a Monday and Thursday cycle alternately. At least four calls were made on each housewife and more if the investigator considered special assistance necessary to enable the housewife to keep a reliable record.

13. If, at the end of two days, the investigator had not succeeded in placing all her log-books with the informants originally selected, she attempted to complete her quota on the third day by choosing substitute informants in accordance with a prescribed procedure. Substitution was necessary if the investigator met with a refusal, whatever the reason ; if the housewife was away from home ; if no answer could be obtained ; or if the original address proved unsuitable. Care was taken in compiling the lists to exclude premises such as boarding-houses, hotels and public houses but it was not always possible, for example, to recognise them by the address. The investigator was instructed to ignore such addresses but to include shopkeepers provided they were able to give full details of any food taken from the shop. A further source of wastage

was households who agreed to keep a log-book, but failed to complete it. If this failure was apparent by the third day, the investigator was instructed to provide a substitute.

14. Substitutes were chosen by visiting in turn each house to the right of the original address until the investigator had succeeded in placing the log-book. This was admittedly a second best and the investigator was expected to make every effort to interview each housewife on her original list before selecting a substitute.

B. Completing the Log-book

15. The log-book used in the survey contained the following sections :¹

(1) A front page on which were entered the name and address of the housewife and the sex, age and occupation of all members of the household. These particulars were entered by the investigator during her first visit.

(2) A double-page for each day of the week divided into sections for recording :

(a) quantity and cost of all food purchased ;

(b) quantity and estimated value of all food obtained from other sources (for example gifts, gardens and allotments) ;

(c) dishes served at each meal provided in the household and the number of persons, including any visitors, present ;

(d) the number of meals eaten away from home by each member of the household and an indication of the place where each meal was taken.

(3) A final page with space for notes by the investigator and comments by the housewife.

(4) A detachable sheet, retained by the investigator, on which she entered the stocks of each food found in the household on her first and last visits, a summary of the quantities entering the household daily and of the daily consumption.

16. At the first call, the investigator explained the nature of the record to be kept by the housewife and under her direction all purchases of food made that day were recorded. Both the cost and exact weight were entered and where necessary the housewife was lent a spring balance by the investigator. At the same time, the investigator obtained the weight of each foodstuff in the larder for the stock record.

17. Where a bulk store of some foods was kept by the housewife (for example, stored vegetables or potatoes bought by the sack) the housewife was asked to weigh all items taken from the store, and record them as such. Alternatively, she might agree to put aside a smaller quantity weighed by the investigator for use during the week, without drawing further on her bulk store. Thus, from a large store of bottled fruits the housewife might put aside two or three bottles to use during the week. Home-made dishes already in the larder were recorded from the housewife's estimate of the ingredients, and home-made dishes made during the week were checked against purchases and withdrawals from store. Home-made foods such as jam, put into the larder during the survey week for storage, were specially treated.²

18. At subsequent calls, the times of which were arranged at the first call, the investigator ascertained whether an accurate daily record had been kept ; the weight and description of each purchase ; that all meals of each member had been accounted for ; and that food items comprising these meals had been drawn either from the stock list or from purchases. The actual quantities of foods eaten at the meals were not recorded, nor was any attempt made to determine the consumption by individual members of the households, but the housewife's description of the dishes she had served at each meal was found to provide a satisfactory check that all items purchased, or withdrawn from the larder during the survey week, were recorded.

19. The investigator's final call was made as far as possible exactly one week after the first call and between the same meals. At this call, the investigator carried out the second weighing of food stocks. In some instances, further calls were necessary after the completion of the log-book in order to settle queries arising during the editing of the data.

Editing and Tabulation

20. After checking the logs, the editing section of the agency concerned with the fieldwork transferred the information from each log-book to a single sheet in a form suitable for further transfer to punched cards. For each food, the total quantity consumed and purchased and the money expended on the purchase were recorded. Home-made foods found in the larder were converted back into their original

¹ Specimen front, double-page and stock-sheet are reproduced at the end of this Appendix.

² See paragraph 26 below.

ingredients, only those cakes, for example, purchased as such appearing on the transfer sheets against that item. The transfer sheets also contained details of household composition, the age, sex and occupation of each member of the household in coded form, and certain totals such as that of expenditure on food by the family during the survey week.

21. The work of the agency finished when the transfer sheets were completed and all further punching, tabulating and analysis was carried out by the Ministry of Food staff. As soon as the last queries were settled in the field, the log-books were retained by the Ministry as a permanent record of the Survey, after the agency had removed the name and address of the informant from the log-book to ensure that information relating to any individual family was kept confidential.

22. At monthly intervals the cards punched from the transfer sheets were assembled and tabulated. The counting of the number of households and persons in the sample, and the computation of the average consumption quantities and money expended on different foods, required a simple use of punched card procedure. The bulk of the machine work lay in the conversion of consumption quantities into their equivalents in terms of calories and nutrient equivalents and the computation of average nutrient intake figures. During the war years of the Survey, the conversion into calories and nutrient equivalents was done by an electric multiplying punch, when the average consumption quantities per person had been calculated. After the war the method was changed so that separate nutrient intake figures were computed for each individual household in the sample. This was possible by the use of a standing master ready-reckoner file of punched cards, about 70,000 in number, on which the calorie and nutrient equivalents for quantities, increasing by 1 oz. at a time up to the largest quantity likely to be recorded in a log-book, were filed for each type of food. The punched cards were retained for use in further analyses and monthly figures were later combined to give quarterly and annual averages.

Definition of a " Person "

23. Two important definitions had to be decided. The first related to the definition of " persons " in the surveyed households, and the second to the food " consumed " during the survey week.

24. As noted in paragraph 7 above, from 1943 onwards the members of the household were defined as those consuming at least 16 meals supplied by the housewife during the survey week, or proportionately less if the normal meal pattern was less than four a day. On this definition, the household extended further than the family in the biological sense and included lodgers, if their meals were provided by the housewife, and a member of the household could take at least every midday meal out without losing his status as a person in that household. The number of persons in a household thus defined corresponded with the number of ration books held by the housewife.

25. If " person " had been defined as a number taking rather more or rather less than 16 meals at home during the week, it would have made little difference either to the total number of persons included in a large sample of households or to the average figures of consumption per person. In a test analysis of 544 households surveyed in July 1948, for example, the numbers of individuals eating a given number of meals provided by the housewife were found to be as follows :—

TABLE 1
Number of Individuals eating 28 or less meals at home during the Survey week

Number of meals	Number of individuals	Cumulative Totals
25-28	1,530	1,530
20-24	247	1,777
19	9	1,786
18	13	1,799
17	6	1,805
16	7	1,812 (a)
15	4	1,816
14	2	1,818
3-13	115	1,933
2	77	2,010
1	178	2,188

(a) Number of persons under present definitions.

Recording of Home-made Food

26. The second difficulty related to home-made foods. When stock measurements are introduced, home-made foods are logically best treated in terms of their ingredients, so that "consumption" would always mean the usage of foods in the form in which they enter the household, either as purchases or "free". But this is not practicable without great labour and the simpler alternative was adopted of recording stocks of home-made jam, for example, simply as so much jam. The difficulty in this method is that households which are adding to their stocks of home-made foods during the survey week may record a *negative* consumption of these foods when changes in stock levels are taken into account. On the other hand, the sugar and fruit turned into jam for storage will all be recorded as consumption of these particular foods. Apart from other reasons, the technical difficulty of dealing on the Hollerith machines with quantities some of which may be positive and some negative resulted in the adoption of a hybrid system whereby all home-made foods were recorded as the products and not the ingredients, except for those stocks made during the survey week. These were translated back into their ingredients so that the current value of jam could not appear in the closing stock of jam and the consumption of jam could not be negative. As a result, since the replenishing of stores during the survey week was disregarded in this way, the consumption of home-made foods was correspondingly overestimated when the stock level adjustments were made, and that of their ingredients underestimated. The effect of this distortion on the consumption estimate of a particular food depended upon the extent to which the home-made products normally contributed to larger stocks. For suet and dripping, it may have been appreciable.¹

Food Purchased and Consumed outside the home

27. The National Food Survey data relate to food purchased or obtained free for consumption in the home and for packed meals eaten outside the home, but prepared by the housewife. Although no similar records exist of food eaten in meals consumed outside the home, an attempt has been made to estimate their approximate energy value in order to provide a rough measure of the share in total consumption provided by the domestic diet.

28. An estimate of this kind can be made on the basis of the numbers and types of different meals eaten outside the home recorded in the log-books. Conversion into energy value can be made on the assumption that a meal taken outside the home has the same value as a similar meal eaten at home, and an average value calculated on the basis of the following weights: Breakfast 3, Dinner 4, Tea 1, Supper 2. The result suggests that approximately 6 per cent of total energy value is supplied by meals prepared and eaten outside the home. This is certainly an underestimate since no record is made in the log-books of snacks and items of food eaten between meals. Moreover, housewives whose families normally eat a large number of meals away from home are likely to be out when the investigator calls and these families are as a result under-represented in the sample.

29. An alternative estimate can be made on the basis of the Ministry's complete records of numbers and types of meals (breakfasts, main meals, subsidiary meals and tea meals) taken in catering establishments of all kinds. These records provide an enumeration of meals more exhaustive than the log-books and, by applying to them the calorie conversion factors deduced from the survey data, a figure of 250-300 calories a day, or 10 to 12 per cent of total intake, is obtained. For urban working-class households, it is probable that these figures are too high for it is known from the samples of middle-class households that outside meals play a more important part in the diet of these households than of the urban working-class. Considering the evidence from the log-books and from the Ministry's catering records together, it seems likely that the proportion of total energy value derived from outside meals by urban working-class households is nearer 8 to 10 per cent.

The Accuracy and Reliability of the Survey Figures

30. The accuracy of the information provided by the Survey depends on

- (a) the extent to which the households which supplied records formed a representative cross-section of the population studied;
- (b) the accuracy of the details given in each log-book;
- (c) the variability of food habits and consumption.

¹ See paragraph 86 above.

Of these, the last is probably the least important and the effect on the results is amenable to the usual statistical treatment applicable to sampling variations. The second factor and, to some extent, the first would have been operative even if the Survey had attempted to cover the whole population instead of a sample. Their effect is much more difficult to assess.

A. The Composition of the Sample compared with the Population

31. The procedure by which the households in the inquiry were selected should in principle have resulted in a sample representative of the urban working-class population of Great Britain. There are two qualifications to this. First, due to the restricted number of mobile investigators, the towns selected did not always give a sufficient weighting to the smaller towns, in particular those containing fewer than 50,000 inhabitants. This is unlikely to have affected the estimates of total consumption, but some bias may have been introduced into the composition of the diet, and statistics of purchases and consumption of fish and of some vegetables and other home-produced food may differ slightly from the population averages.

32. Secondly, certain types of housewives were less ready to co-operate or were more difficult to find at home. Of those pre-selected, about 20 per cent were out or away and could not be found after the third attempt by the investigator, while a further 30 per cent did not wish to co-operate because of sickness or, for example, the pressure of housework. Substitute households thus formed about half of the final sample, but the effect of the resulting bias, so far as the age and sex distribution of the sample is concerned, was not very marked. This is seen from the Table below, which compares the composition of the urban samples in 1946 with that of the civil population in the same period. The Survey figures are a weighted average of the working and middle-class samples, using a weight of 20 per cent for the latter.

TABLE 2
Age Composition of the civil population of Great Britain, 1946, actual and as represented by the Survey Sample

	Actual (a)	Survey (b)
	%	%
Children : under 5 years	8.0	11.3
5-13 years	12.7	13.9
Adolescents : (14 to 20 years) ...	9.0	8.6
Adults : (21 to 59 years)		
males	24.4	23.7
females	29.8	29.4
Adults : (60 and over)		
males	6.9	5.3
females	9.2	7.8
	100.0	100.0

(a) Registrar General.

(b) Combined working-class and middle-class data (the latter weighted 20%); no allowance made for people living in hotels, institutions and similar establishments.

33. The principal difference is that children are over-represented and the reason for this is simply that women with young children were more frequently at home when the investigator called. There was little difference in this respect or in other details, such as the average expenditure per head, between households occurring on the pre-selected lists and the households replacing those where it was not possible to place a log-book, but the general result was that the Survey records showed a lower consumption than if the population had been exactly represented. Rough calculations suggest a difference of 50 to 100 calories per person per day.

34. The bias towards the larger towns and towards the households with children persisted throughout the period. There were also changes in the sample from one year to another that affected the comparability of the results. These included

- (a) a more marked under-representation of the smaller towns in the war years when it was most difficult to recruit an adequate number of mobile investigators ;

- (b) the exclusion of repeat households after 1943 (paragraph 52 above) ;
- (c) the effect of evacuation which resulted in an under-representation of children in the earlier war years compared with subsequent years (see Introduction paragraph 7 above) ;
- (d) the effect of introducing a middle-class sample during the period 1944 to 1947 (paragraph 53 above).

Their importance, noted in the Report, was small.

C. The Accuracy of the Information given by the Housewife

35. The information supplied by the housewife was carefully checked at each stage to avoid the omission of any item and to ensure that the record covered all food items consumed in the house and all meals such as snacks or packed meals, made up from food purchased by the housewife, but there was still the possibility that the Survey itself would affect the food habits of the household. No direct comparison can be made but some light is indirectly thrown on the question by comparing purchases with consumption. During a short period these two items will differ because some food will be purchased and either not consumed that week, or consumed in part only, and the remainder added to store, while consumption of other items may be entirely from quantities in store. For individual families, stock variations in a week may be quite large, especially as many foods are bought less frequently than once a week. But, over a long period, stock changes should balance out so that average intake, as calculated from the total of food purchased and obtained free from gardens and allotments, should be the same as consumption. The Table below shows that this was not the case.

TABLE 3
Energy value of food recorded as purchased and as consumed 1943 to 1945

	<i>Calories</i>		
	1943	1944	1945
Purchased and free food ...	2,213	2,276	2,265
Consumption	2,272	2,387	2,375
Consumption as percentage of purchases	103%	105%	105%

36. There was a tendency for purchases during the survey week to be about 5 per cent below normal and for stocks to be used to make good the difference. As the following results show, this did not affect all foods.

TABLE 4
Foodstuffs showing percentage excess of consumption above purchases plus free food 1943-1945

Flour, bread, fish, milk and rationed meat ... ..	...	...	less than 1%
Other meat (including canned meat), green vegetables and cheese ... ..	...	...	2-5%
Root vegetables and potatoes, sugar and jam, shell eggs, fats ... ..	...	...	6-9%
Biscuits, cakes and other cereal products, fruit (including canned fruit), other vegetables (including onions and canned vegetables), dried eggs, canned fish, condensed and dried milk, beverages ... ..	...	...	10% and above.

37. Foods which deteriorate quickly on storage showed little discrepancy whereas those which can be stored for long periods, in particular canned goods, were drawn upon to a much greater extent during the survey week. This is to be expected. Each investigation takes about an hour of a housewife's time for several days during the course of the survey week and she may find herself unable to find the time to do all the shopping she would otherwise have done. When this happens, it is likely to be the foods with the longer storage life which are drawn on in the emergency since larger stores of these will normally be found in the larder. For these reasons, it is considered that the consumption records give a better estimate of the usual weekly household food supplies than records of actual purchases.

C. Sampling Variations

38. There remains finally the question of sampling variations. The unit of the sample was the household and an individual household may contain any number of persons from one even to sixteen or even eighteen on the Survey definitions. The extent of the variations is illustrated by the following Table :—

TABLE 5
Size of individual households in the Survey Sample 1946

No. of Persons in Household	Percentage of Households in sample
1	7.7
2	20.6
3	26.1
4	21.5
5	12.8
6	5.5
7 to 9	5.0
10 and above	0.8

39. Further, when account is taken of the composition of the household in terms of the age, sex and occupation of each member and of the number of meals eaten at home, it will be realised that differences in the domestic food consumption of individual households, as measured, say, in calories, may be even greater. For example, out of 1,959 households surveyed during the first quarter of 1949, the household with the lowest total units of energy value during the week was a single person household (6,760 calories) while the household with the highest total intake was one containing ten persons (238,400 calories), giving a range of one to thirty-five in terms of calories as compared with a range of one to ten in terms of persons.

40. It is to be expected, therefore, that samples of the same number of households, obtained by the same methods, and with the same regional distribution, will show some variations in the results computed from them. Since average figures per person per week form the main basis of this report, this variation in the results has been estimated and is shown in Table 6, measured in terms of the percentage standard errors of the averages given in the report. These standard errors have been estimated in each case for samples of 2,000 urban working-class households, or approximately the number of households surveyed each quarter of the year. The relatively high figure shown for vitamin C reflects the fact that this vitamin is derived mainly from fresh fruit and vegetables, the consumption of which is highly variable in individual households.

TABLE 6
Percentage Standard Errors (samples of 2,000 households)

Expenditure per head per week	0.58
Energy value (Calories) per head per day ...	0.34
Protein intake per head per day	0.51
Vitamin C intake per head per day	1.10

41. Thus, in the first quarter of 1947, when the average energy value per head per day was 2,321 calories, based on 2,085 urban working-class households, a percentage standard error of 0.34 gave a standard error of 7.9 calories. From this it follows that 95 out of every 100 repeat samples taken under exactly the same conditions would have yielded estimates of average energy value lying between 2,305 and 2,337 calories. The percentage standard error of the annual averages given in the tables would be one-half of the errors shown above, since the annual figures are computed from approximately four times as many households.

42. Similar figures can be given (Table 7) for individual foodstuffs, but to some extent the results are influenced by the fineness of the grouping used. For example, rationed meat has been divided into five main groups and the percentage standard errors (again for samples of 2,000 households) range between 2.2 per cent and 2.7

per cent, except for pork, but taking all rationed meat together, the average consumption per person had a standard error of only 0.8 per cent. Although meat was a rationed commodity, an appreciable, if small, variation is shown. There are two reasons for this. Firstly, meat was rationed by value so that the actual quantity obtained varies with the cut and kind of meat purchased. Secondly, the consumption even of rationed commodities did not proceed at the same rate week after week. Part of one week's purchases could be carried over into the following week, or could be used for cooking, and not immediately consumed. The fact also that more than one week's ration could be obtained at a time, occasionally influenced consumption and caused it to be less regular. In the same way, while the percentage standard error for the consumption per head of all rationed fats was 0.5 per cent, the separate figures for the three constituents were between 0.8 per cent and 1.2 per cent. The variation in consumption of foods other than the rationed foods or the more important items is seen to be much larger, for the proportion of households consuming them in one week is usually smaller.

TABLE 7
Percentage Standard Errors in weekly per capita food consumption of samples of 2,000 Families

	%		%
Corned beef	2.6	Other vegetables	1.8
Stewing beef	2.7	Self-raising flour	1.6
Other beef	2.3	Bread	0.7
Mutton and lamb	2.2	Cakes (including buns and scones)	1.6
Pork	8.3	Biscuits	2.8
Butter	1.1	Suet	3.7
Margarine	0.8	Syrup and treacle	3.4
Lard and cooking fat	1.2	Cocoa	2.9
Sugar	0.8	Coffee	7.5
Jam and rationed preserves (a) ...	1.6	Condensed milk	3.7
Tea	0.7	Dried milk	6.8
Liquid milk	1.0	Offal	4.8
Cheese	1.2	Rabbits, poultry, game	8.8
Shell eggs	1.5	Tomatoes	2.6
Dried egg (a)	1.1	Fresh fruit	2.4
Sausage	2.3	Dried fruit	3.7
Fish (fresh)	2.4	Plain flour	7.2
Potatoes	1.2	Oat products	4.0
		Breakfast cereals	3.3

(a) 1946

All the figures relate to consumption. Purchases are in most cases more variable than consumption and the corresponding percentage standard errors are higher since some of the irregularity of purchases is cushioned by larger stocks.

APPENDIX B

The National Food Survey

Estimated Food Consumption in Urban Working-Class Households 1942 (a) to 1949

per head per week

Foods	1942	1943	1944	1945	1946	1947 (c)	1948 (d)	1949
Liquid milk pints	3.5	3.9	4.0	4.1	4.0	4.0	4.1	4.4
Condensed and dried milk ... equivalent pints	0.3	0.4	0.4	0.3	0.4	0.4	0.3	0.4
All milk pints or equivalent pints	3.8	4.3	4.4	4.4	4.4	4.4	4.4	4.8
Cheese oz.	3.6	3.1	2.6	2.5	2.5	2.3	1.9	2.2
Rationed meat oz.	13.8	14.2	14.2	13.8	13.7	12.9	11.6	11.4
Corned beef oz.	—	—	—	0.7	1.3	2.2	1.1	0.6
Canned meats oz.	1.4	1.3	1.7	1.6	1.7	1.9	1.1	0.7
Sausages oz.	4.0	3.8	4.1	3.9	4.2	4.1	4.7	4.2
Miscellaneous meats (b) oz.	3.1	2.9	3.8	2.8	2.6	2.2	2.4	3.1
Bacon oz.	4.0	4.0	4.6	3.5	3.2	2.2	2.1	2.7
All meats oz.	26.3	26.2	28.4	26.3	26.7	25.5	23.0	22.7
Fish (other than canned) oz.	6.0	5.7	6.5	8.2	9.6	8.8	9.4	8.0
Canned fish oz.	0.6	0.9	1.2	1.0	0.9	0.8	0.4	0.4
All fish oz.	6.6	6.6	7.7	9.2	10.5	9.6	9.8	8.4
Eggs, shell no.	0.9	0.8	0.9	1.3	1.4	1.6	1.9	2.8
Eggs, dried equivalent no.	0.5	1.4	2.0	1.7	1.1	0.7	0.4	0.1
All eggs no. or equivalent no.	1.4	2.2	2.9	3.0	2.5	2.3	2.3	2.9
Butter oz.	2.0	2.0	2.1	2.2	2.8	2.9	3.2	3.5
Margarine oz.	4.2	4.2	4.3	4.2	3.5	3.3	3.9	4.2
Cooking fats, rationed oz.	1.8	2.0	2.0	1.5	1.2	1.0	1.1	2.1
Suet and dripping oz.	0.7	0.6	0.9	0.8	0.8	0.6	0.7	0.9
All fats oz.	8.7	8.8	9.3	8.7	8.3	7.8	8.9	10.7
Tomatoes oz.	2.5	2.8	2.4	2.6	2.9	4.9	5.3	5.8
Other fresh fruit oz.	6.9	7.9	9.2	11.2	10.7	14.1	14.8	13.6
Canned and bottled fruit oz.	1.3	0.8	0.7	0.6	0.9	1.5	1.7	1.8
Dried fruit and nuts oz.	1.5	1.2	1.6	1.5	1.2	1.2	1.0	1.2
All fruit oz.	12.2	12.7	13.9	15.9	15.7	21.7	22.8	22.4
Potatoes oz.	66.2	68.6	69.0	65.7	70.5	67.2	61.6	65.4
Chips oz.	2.3	2.6	2.4	2.8	3.3	3.7	4.4	3.5
Fresh green vegetables oz.	11.9	15.1	16.1	14.7	14.9	9.3	13.1	12.1
Fresh peas and beans oz.	3.5	4.0	3.9	3.9	2.8	3.3	4.3	2.8
Carrots oz.	3.9	3.8	3.8	3.9	3.6	3.1	3.5	2.8
Other root vegetables and miscellaneous fresh vegetables oz.	9.5	8.9	10.6	10.0	9.2	10.2	8.5	8.7
Canned and dried vegetables oz.	2.6	2.8	2.9	3.9	4.1	4.9	3.3	4.6
All vegetables oz.	99.9	105.8	108.7	104.9	108.4	101.7	98.7	99.9
Bread oz.	60.6	59.7	59.9	61.8	59.9	62.5	65.3	61.1
Flour oz.	6.4	6.9	7.1	6.2	6.1	5.4	6.2	6.9
Biscuits oz.	2.6	1.8	2.0	2.9	2.6	2.2	2.6	2.9
Cakes, buns and scones oz.	7.0	8.4	9.6	10.4	9.5	9.4	10.4	9.2
Oatmeal and oat products oz.	1.7	1.3	1.4	1.3	1.3	1.2	1.3	1.2
Breakfast cereals oz.	0.8	0.8	0.9	0.9	1.0	1.1	1.5	1.5
Other cereal foods oz.	2.4	2.4	2.4	2.0	2.1	2.1	2.5	2.6
All cereal foods oz.	81.5	81.3	83.3	85.5	82.5	83.9	89.8	85.4
Sugar oz.	8.4	8.7	9.1	9.1	9.6	10.2	10.5	10.9
Preserves oz.	4.9	5.2	6.1	5.5	5.4	5.5	5.0	6.2

- (a) No consumption figures available for 1940 and 1941.
 (b) Offals, rabbits, poultry, game and cooked meats.
 (c) Nine months' average.
 (d) Ten months' average.

The National Food Survey

Food Purchases in Urban Working-Class Households 1940 to 1949

per head per week

Foods	1940		1941	1942	1943	1944	1945	1946	1947 (b)	1948 (c)	1949	
	July	Oct.										
Liquid milk pints	2.8	3.1	3.3	3.4	3.8	3.9	4.1	3.9	3.8	3.9	4.1	
Condensed and dried milk equivalent pints	0.5	0.3	0.2	0.3	0.3	0.4	0.3	0.4	0.4	0.4	0.3	
All milk pints or equivalent pints	3.3	3.4	3.5	3.7	4.1	4.3	4.4	4.3	4.2	4.3	4.4	
Cheese oz.	3.0	2.7	1.9	3.5	3.0	2.5	2.4	2.4	2.2	1.9	2.1	
Rationed meat oz.	18.1	19.0	13.4	13.8	14.0	14.0	13.7	13.6	12.8	11.6	11.4	
Corned beef oz.	—	—	—	—	—	—	0.7	1.3	2.0	1.0	0.5	
Canned meats oz.	0.6	0.5	0.5	1.4	1.3	1.6	1.6	1.6	1.8	0.6	0.7	
Sausages oz.	3.3	4.3	4.2	4.0	3.7	4.0	3.8	4.2	4.1	4.7	4.2	
Miscellaneous meats (a) oz.	4.0	5.5	5.5	3.0	2.8	3.5	2.6	2.4	2.0	2.8	2.9	
Bacon oz.	3.1	2.8	3.9	3.9	3.9	4.5	3.4	3.1	2.1	2.0	2.6	
All meats oz.	29.1	32.1	27.5	26.1	25.7	27.6	25.8	26.2	24.8	22.7	22.3	
Fish (other than canned) oz.	4.9	3.4	4.7	5.8	5.6	6.3	8.1	9.5	8.7	8.6	7.8	
Canned fish oz.	1.5	1.4	1.0	0.6	0.8	1.0	0.9	0.9	0.7	0.4	0.4	
All fish oz.	6.4	4.8	5.7	6.4	6.4	7.3	9.0	10.4	9.4	9.0	8.2	
Eggs, shell no.	2.7	2.0	1.4	0.9	0.6	0.6	1.0	1.1	1.3	1.6	2.3	
Eggs, dried equivalent no.	—	—	—	0.5	1.2	1.8	1.5	0.9	0.6	0.3	0.1	
All eggs no. or equivalent no.	2.7	2.0	1.4	1.4	1.8	2.4	2.5	2.0	1.9	1.9	2.4	
Butter oz.	3.4	1.8	2.3	1.9	2.0	2.0	2.1	2.7	2.8	3.0	3.4	
Margarine oz.	3.6	3.9	4.1	4.0	4.0	4.1	3.9	3.3	3.1	3.7	4.0	
Cooking fats, rationed oz.	1.5	0.9	1.5	1.8	1.9	1.9	1.5	1.2	1.0	1.0	2.1	
Suet and dripping oz.	0.8	1.1	0.6	0.4	0.5	0.5	0.3	0.4	0.3	0.4	0.4	
All fats oz.	9.3	7.7	8.5	8.1	8.4	8.5	7.8	7.6	7.2	8.1	9.9	
Tomatoes oz.	3.8	2.1	1.2	2.3	2.3	1.9	2.0	2.6	4.5	4.9	5.3	
Other fresh fruit oz.	9.4	11.6	4.7	7.0	6.3	7.5	9.6	9.3	12.2	12.8	11.8	
Canned and bottled fruit oz.	3.5	2.7	0.8	1.0	0.5	0.2	...	0.3	0.7	1.2	1.2	
Dried fruit and nuts oz.	1.3	1.5	1.0	1.3	1.2	1.6	1.5	1.3	1.2	1.2	1.3	
All fruit oz.	18.0	17.9	7.7	11.6	10.3	11.2	13.1	13.5	18.6	20.1	19.6	
Potatoes oz.	} 48.7	62.4	69.4	62.4	61.1	62.4	59.7	65.7	62.1	54.8	61.0	
Chips oz.		2.3	2.6	2.3	2.6	2.3	2.8	3.3	3.5	4.4	3.5	
Fresh green vegetables oz.		8.0	13.2	10.9	11.8	11.7	12.6	12.6	12.9	8.0	11.0	10.2
Fresh peas and beans oz.		16.4	1.1	3.2	3.5	2.6	2.8	2.9	2.0	2.6	3.0	2.1
Carrots oz.		} 9.7	15.5	4.9	3.4	3.5	3.4	3.6	3.4	2.8	3.1	2.7
Other root vegetables and miscellaneous fresh vegetables oz.			8.6	9.0	6.8	8.2	8.0	7.6	8.6	7.1	7.3	
Canned and dried vegetables oz.		1.5	2.2	2.3	2.2	2.5	2.6	3.6	3.8	4.6	3.2	4.4
All vegetables oz.	84.3	94.4	99.3	94.6	90.8	94.3	93.2	98.7	92.2	86.6	91.2	
Bread oz.	58.1	57.6	60.5	59.5	59.1	59.3	61.0	59.1	61.9	64.7	60.0	
Flour oz.	11.5	10.5	12.9	6.4	6.7	7.4	6.4	6.1	5.5	6.5	7.2	
Biscuits oz.	2.9	2.8	2.6	2.5	1.7	1.8	2.7	2.5	2.1	2.4	2.8	
Cakes, buns and scones oz.	5.1	5.7	6.3	6.3	7.9	8.3	9.1	8.3	8.3	9.4	8.5	
Oatmeal and oat products oz.	1.1	1.5	1.4	1.5	1.1	1.3	1.2	1.2	1.1	1.3	1.1	
Breakfast cereals oz.	} 3.2	1.0	0.7	0.7	0.7	0.8	0.9	0.9	1.0	1.4	1.4	
Other cereal foods oz.		2.2	2.2	2.1	2.0	2.2	1.7	1.9	2.0	2.4	2.4	
All cereal foods oz.	81.9	81.3	86.6	79.0	79.2	81.1	83.0	80.0	81.9	88.1	83.4	
Sugar oz.	10.6	7.9	8.6	8.4	8.8	9.1	9.1	9.8	10.4	10.7	10.8	
Preserves oz.	4.3	3.3	4.0	3.6	4.5	4.8	4.3	4.5	4.5	5.0	5.2	

(a) Offals, rabbits, poultry game and cooked meats. For 1941 pies included.

(b) Nine months' average.

(c) Ten months' average.

... less than 0.05.

Note.—For 1940 and 1941 certain items are grouped since no separate figures are available.

INDEX

(Numbers refer to paragraphs ; App. — Appendix A ; fn. — footnote)

- Advisory Committee on Nutrition 8-13, 18, 131
Agriculture 19, 157, 166 ; Dept. U.S.A. 145
fn. ; — al workers 64
Allotment produce *see* Gardens
Anaemia 134
Aneurin *see* Vitamin B₁
Ascorbic acid *see* Vitamin C
- Bacon *see* Meat
Balance of payments, currency, dollars 161, 186, 210
Barley *see* Cereals
Bias 5, 169
Biscuits *see* Cereals
Blackcurrant syrup and puree 25
Bread *see* Cereals
Breakfast foods *see* Cereals
British Flour Millers Research Association 117
Broadley *see* Crawford and Broadley
"Buffer foods" *see* Bread and Potatoes
Butter *see* Milk
- Cakes *see* Cereals
Calciferol *see* Vitamin D
Calcium from bread and flour 131, 132, 209, 218 ; carbonate 46, 55, 109, 114, 184, 217 ; from cheese 131, 133, 218 ; from eggs 56, 131 ; consumption, intake 10, 55, 177 ; from meat 74 ; from milk 46, 56, 62, 131-133, 184, 217 ; phytic acid 114 ; requirements 11 ; from rationed foods 133, 178, 218 ; from vegetables 218 ; supply 12, 131, 217.
Calories *see* energy foods
Canteens *see* meals
Carnegie Survey *see* Rowett Research Institute
Carotene *see* Vitamin A
Carrots *see* Vegetables
Cereals consumption 9, 29, 175, 208 ; energy value 120, 122, 214 ; nicotinic acid 149, 223 ; pre-war diet 12 ; protein 126, 215 ; supplies 162 ; vitamin B₁ 143, 221
Barley 46, 102
Biscuits 45, 164
Bread, flour, bread and flour
calcium fortification 22, 62, 114, 177, 184, 218 ; consumption 13, 43, 103, 184, 208 ; extraction rate 22, 43, 46, 48, 55, 102, 109, 114, 134, 145, 146, 148, 177, 207, 217, 223 ; iron 134, 135, 219 ; National Wheatmeal 104 ; nutrient value, composition 41, 46, 109, 117, 119, 178 ; price 108 ; protein 125, 126, 215 ; ration, rationing 47, 163, 166, 167, 207 ; subsidy 20, 108 ; supplies 17, 26, 164 ; vitamin B₁ 143, 221 ; white flour 105, 107.
Breakfast foods 45, 208
Cakes 47, 86, 87, 105, 164, 208
Oats and oat products 45-47, 102
Rice 44, 45, 158
Sago 45
Tapioca 45
Wheat 26, 102, 158, 164, 166
Cheese *see* Milk
Children, egg consumption 12 ; milk consumption 11
Chocolate *see* Sugar
Cod liver oil 25, 165, 225
Combined Food Board 43, 49
Communal feeding *see* Meals
Controlled distribution *see* Rationing
Cooking fats *see* also fat ; dripping 9, 128 ; consumption 199 ; ration 85, 198 ; supplies 82, 198
Cost of Living Index 28
County War Agricultural Executive Committees 19
Crawford and Broadley "The People's Food" 38, bread 103 ; compared with 1941 41 ; condensed milk 60 ; cooking fats 85 ; dried fruit 90 ; eggs 80 ; fish 76 ; flour 105 ; meats 73 ; potatoes 92 ; preserves 113 ; processed meats 70
- Dairy products *see* milk products
Diabetics 64
Dilution of flour 46, 102
Drinks 4, 47 ; soft 46 ; tea 9, 41, 44, 47 ; ration 168
Dripping 85, 86, 199
- Education Authorities 24, 25
Eggs calcium 56, 131 ; consumption, purchases 9, 34, 41, 79, 175, 178, 194 ; dried 46, 48, 81, 166, 194 ; "free" 80, 194 ; iron 134 ; points 194 ; priority 25, 79, 194 ; protein 13, 126, 215 ; riboflavin 147 ; supplies 12, 79, 162, 192, 194 ; vitamin A 140, 220
Energy foods 10, 13 ; calories from bread and flour 46, 119, 120, 122, 209, 214 ; consumption 212 ; from dairy produce 121, 122 ; from fats 121, 122, 214 ; from fish 120 ; from meat 120, 122, 191 ; from potatoes 93, 119, 202, 214 ; from rationed foods 56, 115, 123, 214 ; requirements 10 ; from sugar and syrup 120, 122, 214 ; supply 119, 120, 213 ; energy value of the diet 42, 43, 118, 119, 122, 213, App. 39, 41, of different groups of foods 115, 120, 121, 214 ; and vitamin B₁ 142
- Family allowances 165
Family composition *see* Household

- Fat from butter 128; from chips 93; consumption, intake 56, 129, 130, 176, 192, 216; from cooking fats 128; deficiency 10; from margarine 128; from meat 74; from milk 62; and palatability 128; from rationed foods 130, 178, 216; supplies 128, 216
- Fats *see also* butter, cooking fats, lard, margarine, dripping, suet; consumption, intake 29, 41, 54, 86, 175, 196, 197, 199, 212; energy value 121, 122, 214; and home-baking 105; and nutrition 114; rationing, rations 55, 164, 167, 175; supplies, imports, shortage 17, 44, 82, 159, 162, 164, 198, 208
- Feedingstuffs 15, 26, 71, 81, 159, 166, 186
- Field workers *see* Investigators
- Fish canned 44, 45, 48, 75, 77, 78, 156, 166, 192, 193, 226; dried 76, 193; energy value 120; fresh, consumption of 9, 26, 76, 77, 165, 175, 192, 193; fried 76, 77; frozen 48; price 192; protein 13, 126, 215; points rationing 45; sardines 48; sea 12; supplies 75, 76, 162, 166, 192; vitamin D 155, 156, 225, 226
- Flour *see* Cereals
- Flux, Sir Alfred 8
- Food domestic consumption, definition 54 fn; expenditure 39; home-made App. 26; inedible portions 4, 117; prices 27; rationing *see* particular foods; supplies, imports, shortage, 3, 10, 15-17, 19, 21, 26, 27, 29, 30, 44-50, 114, 116, 120, 125, 138, 157-159, 161-168, 212, 213, App. 2. *See also* "Food Consumption Levels"
- "Food Consumption Levels" 29, 43, 63 fn., 66, 71, 75, 79, 82, 89, 102, 119, 120, 125, 128, 131, 138, 142, 148, 162, 200, 213, 215-217, 219, 221-224
- Food (Defence Plans) Department, Board of Trade 15-18
- Food, Ministry of 16, 19, 25; experimental kitchens 117
- Food stocks, household 3, 4, 40, 51, 54 fn., 86, 116, App. 4, 17; U.K. 19, 50
- Fruit apples 89; bananas 200; bottled 200; canned 45, 87, 200; citrus, oranges 25, 41, 48, 87-89, 165, 200; consumption 9, 29, 41, 89, 203; dried 45, 87, 200; fresh 25, 87, 89, 136, 200, 203; from gardens 100, 101, 205, 206; soft 88, 166, 211; supplies, imports 47, 136, 162, 166, 177, 178; vitamin C 151-153, 224
- Fruit curd *see* Preserves
- Gardens and Allotments, food from 3, 97-101, 205, 206, App. 15
- Gifts, food as 3
- Health, Ministry of 18
- Heavy workers 172
- Honey *see* Preserves
- Household (or family) budgets 37-40; composition, size, number of children 5, 7, 33, 40, 53, 169-171
- Ice-cream 4
- Incomes, wages, earnings 6, 9, 14, 27, 37, 41, 49, 59, 72
- Investigators, field workers, 3, 5, 6, 169; App. 4, 8, 10-19, 31-33
- Iron consumption, intake 55, 134, 177, 219; from bread and flour 46, 134, 209, 219; from meat 74, 191, 219; from rationed foods 135, 219; supply 10, 12, 219
- Jam *see* Preserves
- Labour, Ministry of 20, 41; Survey 39, 40; apples 89; bacon 71; bread, flour 103, 105, 208; butter 83; cheese 64; cooking fats 85; eggs 80; margarine 84; meat 68, 188, 191; milk 58, 61; oranges 89; potatoes 92; preserves 113, sugar 112
- Lard 44, 85, 198, 199
- League of Nations Health Organisation, Technical Commission 10, 11
- Lend Lease 25, 30, 44, 50, 63, 70, 161, 193, 198
- Liver 43, 55, 74, 139, 140, 220
- Log-book 3, 39, 137; App. 15-19, 29
- Margarine *see also* cooking fats, consumption purchases 9, 34, 83, 84, 197, 199; and fat 128; fortification, vitamin content, 22, 41, 114, 138, 140, 225; price 168; ration 22, 83, 167, 197
- Market Supply Committee 8
- Marmalade *see* Preserves
- Marshall Aid 161
- Meals in canteens, catering establishments, communal feeding, eaten away from home, in restaurants, in schools 24, 46, 47, 164, App. 7, 15, 24, 27-29
- Meat consumption 9, 29, 34, 41, 54, 73, 175, 188, 191; energy value, calories 120, 122, 191, 214; expenditure 69; fat 191; iron 191, 219; nicotinic acid 148, 149, 191, 223; protein 13, 43, 126, 191, 215; price 168, 187; riboflavin 146, 147, 222; ration, rationing 20, 66, 166, 187, 188, 219; subsidy 20; supplies, imports, shortage 17, 44, 46, 66, 114, 162, 164, 166-168, 186, 192, 207; vitamin B₁ 143, 221
- Bacon consumption, ration, rationing 20, 48, 71, 166, 168, 190, 191; subsidy 20; supplies 71, 72, 114, 164, 166, 190
- Beef 67
- Canned, corned meat 44, 45, 48, 66, 70, 166, 186, 188, 189, 219
- Game 47, 68, 70, 162, 189
- Mutton and lamb 67, 188
- Offals 66, 68, 70
- Pies 47, 86
- Pork 66, 67
- Poultry 26, 47, 68, 70, 189
- Processed meat 70
- Rabbits 47, 68, 70, 189,
- Sausages 47, 70, 189
- Medical Research Council 18, 42, 117, 134 fn., 152 fn.
- Middle class 53, 172, 173, App. 8, 29, 34
- Milk, dairy products calcium 56, 131-133, 184, 217, 218; condensed 9, 45, 60; consumption, purchases 9, 11, 34, 35, 41, 44, 45, 55, 59, 61, 131, 175, 178, 181, 183, 184; in catering establishments 116; distribution 46, 114, 167, 168, 180, 182; dried 60, 114; energy value, calories 121, 122, 214; National Milk Scheme, free,

- cheap, priority, welfare, 18, 25, 35, 54 fn., 59, 116, 165, 167; National household milk 60; National dried milk 60; price 59, 181; processed 182; protein 13, 126, 215; riboflavin 62, 145-147, 222; subsidy 20, 181; supplies, production, sales, 26, 58, 66, 162, 166, 167, 177, 180, 181; vitamin A 140, 220; vitamin B₁ 143, 221
- Butter consumption, purchases 9, 34, 41, 83, 195, 196, 199, 225; fat 128; price 168; rations, rationing 20, 83, 114, 196, 197; supplies, shortage 22, 43, 82, 195; vitamin A 140; vitamin D 225
- Cheese calcium 131, 133, 218; consumption, purchases 9, 41, 64, 65, 175, 185; price 168; protein 126; ration, rationing 22, 48, 64, 65, 168, 185; riboflavin 147; supplies 44, 48, 63, 185
- Mince-meat *see* Preserves
- Minerals 13
- Mothers, expectant 12, 18, 25, 59, 66, 79, 88, 136, 165, 207; nursing 11, 12, 79, 165 fn.
- Mutton *see* Meat
- Nicotinic acid from bread and flour 46, 148, 223; from cereals 189, 223; consumption, intake 55, 176, 177; from meat 74, 148-150, 191, 223; from potatoes 93; from rationed foods 150, 223; supply 148, 223; values 145 fn.; from vegetables 149
- Nutrient(s) *see also* individual nutrients; 25, 43, 176, 212; allowance for losses 117; conversion factors, equivalents 4, 42, 43, 117, 140, 145 fn.; intake 177, 212; made-up dishes 117; from meat 94, 191; from milk 62, 184; from rationed foods 56, 115
- Oats and oat products *see* Cereals
- Old age pensioners 172
- Orange juice 25
- Oranges, citrus fruit *see* Fruit
- Orr, "Food, Health and Income" 37; butter 199; condensed milk 60; fresh fruit 89; fish 76; lard, suet and dripping 85, 199; margarine 199; meat 73; sugar 112; vegetables 203
- Phosphorus 12
- Phytic acid *see* Calcium carbonate
- Pies *see* Meat
- Pigs 26
- Potatoes consumption 9, 34, 41, 54, 92, 175, 201; energy value, calories 93, 119, 121, 202; fat 93; from gardens and allotments 99-101, 205, 206; nicotinic acid 93; protein 125; ration, rationing 163, 166, 167, 172, 175, 201, 205, 212, 224; stored 166; supplies, acreage, shortage 12, 26, 29, 91, 162, 166, 175, 201, 207; vitamin B₁ 93, 143, 144; vitamin C 93, 152, 153, 224
- Poultry *see* Meat
- Preserves consumption, purchases 54, 112, 175, 211; energy value, calories 122, 214; fruit curd 111; honey 45, 111; jam, consumption 9, 86; jam, home-made 86, 113, App. 26; jam production 88, 166, 211; jam ration 22, 48, 111, 167, 210, 211; marmalade 45, 111, 210, 211; mince-meat 111.
- Protein animal 10, 124, 126, 212, 215; from bread and flour 43, 46, 125, 126, 209; from cheese 126; from eggs 13, 126, 215; from fish 13, 126, 127, 205; intake 177, 215; from meat 13, 43, 74, 126, 191, 215; from milk 13, 62, 126, 215; from potatoes 125; from rationed foods 127, 215; supplies 124, 125, 215; vegetables 124, 215
- Rationing, controlled distribution 17, 20, 22, 23, 29, 41, 47, 56, 114 App. 2; personal points, points scheme, points rationed foods 45, 46, 56, 70, 88, 123, 156, 178, 194, 207, 219, 226; *see also* individual foods, energy foods and nutrients
- Requirements *see* individual nutrients
- Restaurant meals *see* Meals
- Rice *see* Cereals
- Riboflavin consumption, intake 10, 55, 177, 222; from cheese 147; from bread and flour 145, 146, 222; from eggs 147; from meat 74, 146, 147, 222; from milk 62, 145-147, 222; from rationed foods 56, 147, 178, 222; supply 10, 145, 222; values 145 fn.; from vegetables 222
- Rowett Research Institute 40, 41, 43 fn., 84
- Rural households 32, 77; areas 32, 52, App. 1, 2, 6
- Sago *see* Cereals
- Sample accuracy and reliability App. 30, 35-37; areas covered App. 11; and call up 53; composition App. 31-33; and demobilisation 170; editing App. 20-26; and employment of women 53; and evacuation 53, 169, App. 4, 34; fieldwork App. 11-14; method of selection App. 6-10; origin App. 1-5; repeats 53; tabulation App. 20-26; variations in 52, 53, 169, 172, App. 38
- "Slums" 21, 53
- Social class 6, 38, 53, 173, App. 6
- Subsidies, food 20, 28, 168
- Suet 85, 86, 199
- Sugar consumption 9, 34, 41, 112, 175, 210; energy value, calories 13, 120, 122, 214; and home-baking 105; and nutrition 13; ration, rationing 20, 110, 165, 210; supplies, imports 17, 29, 44, 110, 160, 162, 164, 208, 210
- Chocolate and sugar confectionery, sweets 4, 46
- Syrup and treacle 45, 111, 120
- Syrup *see* Sugar
- Tapioca *see* Cereals
- Tea *see* Drinks
- Thiamin *see* Vitamin B₁
- Tomatoes *see also* Fruit; 87-89, 162, 200
- Treacle *see* Sugar
- Vegetables (other than potatoes) calcium 131, 218; canned 45, 94, 95, 203; carotene 140, 220; consumption 9, 94, 96, 177, 200, 204; crops 50; dried 45, 203; fresh 47, 56, 99-101, 205, 206, 224; from gardens and allotments 97-101, 205, 206; green 26, 94, 175, 178, 203, 204, 224; nicotinic

- acid 149 ; riboflavin 222 ; root 139, 175, 178, 220 ; supplies 94, 162 ; vitamin A 56, 140, 178 ; vitamin B₁ 144 ; vitamin C 56, 136, 224
 Carrots, 26, 43, 140, 220
 Sugar beet 26, 160
- Vegetarians 64
- Vitamin Welfare Scheme 25, 54 fn., 116, 136, 137, 165
- Vitamins 136, 137
 Vitamin A from butter 43, 140 ; carotene 140, 220 ; from carrots 43, 138-140, 220 ; from cheese 140 ; consumption 212 ; from eggs 140, 220 ; from fats 220 ; from liver 43, 55, 74, 139, 220 ; from margarine 114, 138 ; from meat 74, 220 ; from milk 62, 140, 220 ; from rationed foods 141, 220 ; supplies 10, 138, 220 ; from vegetables 56, 140, 178
 Vitamin A and D Tablets 25, 165, 225
- Vitamin B₁ from bread and flour 13, 43, 46, 142, 144, 221 ; consumption, intake 55, 177 ; from meat 74, 143, 221 ; from milk 62, 143, 221 ; from potatoes 93, 143 ; from rationed foods 144, 221 ; supplies 10, 12, 142, 221 ; synthetic 22, 46, 142
 Vitamin C consumption, intake 176, 177 ; cooking losses 117, 152 ; from fruit and vegetables 43, 56, 153, 203, 224, App. 40 ; from meat 74 ; from potatoes 93, 224 ; from rationed foods 154, 224 ; supplies 10, 12, 152, 224
 Vitamin D from fatty fish 155, 156, 225, 226 ; from margarine 114, 155, 225 ; from meat 74 ; from rationed foods 56, 156, 178, 226 ; supplies 155, 225
 Vitamin products 136, 137
- Welfare Foods 18, 25, 35, 41, 54 fn., 59, 116, 165
 Wheat *see* Cereals

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