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LEAGUE OF NATIONS

THE PROBLEM OF NUTRITION

VOLUME I.

**INTERIM REPORT OF THE MIXED COMMITTEE
ON THE PROBLEM OF NUTRITION**

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PREFACE BY THE CHAIRMAN OF THE COMMITTEE.

The marked interest which the last Assembly showed in nutrition was due, in the first instance, to the realisation of the possibilities of great improvements in public health and special betterment through better nutrition ; but, while these factors were undoubtedly uppermost in the minds of delegates, the interest displayed was also due to the fact that, through improved nutrition, it should be possible to contribute, first, towards a solution of national and international agricultural problems and, secondly, towards an improvement in the world economic situation.

Any study of the evidence which can be collected from many sources and from many countries compels one to realise :

The degree to which achievements in these sciences which can be applied to agriculture have increased man's control over nature and therefore his powers of producing food ;

The possibilities which this increase in power of production opens up for improving the standard of living and general well-being of all nations.

Any study of the world as it is, simultaneously brings one face to face with economic difficulties which have to be overcome if mankind is to derive full advantage from the potential abundance which science can make readily available.

One is, indeed, forced to realise that there is as great need for constructive economic thought as for further immediate progress in science.

At the conclusion of its first meeting, the Mixed Committee realised that it would be quite impossible for it to cover the immense field which its terms of reference required in time to present a comprehensive report to the 1936 Assembly.

It therefore decided on an interim report and hopes to be in a position to continue the study of the many aspects of its task and to present a comprehensive report to the Assembly at a later date.

It hopes that even this interim report will, however, make clear to the Assembly that, through national and international action towards improved nutrition, it should be possible to go some distance towards securing in part the heritage which all men are entitled to claim—namely, the possibility of the full enjoyment of the achievements of science.

It is not inappropriate to conclude this brief introduction to this report with a quotation from the final presidential address of Sir Frederick Gowland Hopkins, the late President of the Royal Society of Great Britain, who, referring to the prospective work of the Mixed Committee, said :

“ Policies concerned respectively with the production, transport, distribution and consumption of foods will all, we may hope, be discussed. They seem to be the very proper business of the League, and, if discussion goes deep enough and is frank enough, it may well do no small service to the interests of peace itself.”

ASTOR,

*Chairman of the Mixed Committee
on the Problem of Nutrition.*

INTERIM REPORT OF THE MIXED COMMITTEE ON THE PROBLEM OF NUTRITION.

INTRODUCTION.

I. ACTION TAKEN ON THE DECISIONS OF THE LAST ASSEMBLY.

During the last thirty years or so, and especially since the great war, there has been a growth of interest in nutrition questions in consequence of social and scientific developments. Accordingly, the question of nutrition was taken up several years ago by the Health Organisation of the League of Nations, which found it desirable to make enquiries in certain countries. A report published in its *Quarterly Bulletin* in June 1935 by two of its members, Dr. E. Burnet and Dr. Aykroyd, aroused widespread interest.

At the meeting of the Assembly in September 1935, following a request made by twelve delegations, there was a full discussion of this problem in relation to public health on the one hand and economic and social organisation on the other.

On being referred to the Second Committee, this problem formed the subject of a three-day debate, in which twenty delegations took part. As a result of these discussions, the Assembly adopted the following resolution :

“ The Assembly, having considered the subject of nutrition in relation to public health and of the effects of improved nutrition on the consumption of agricultural products, urges Governments to examine the practical means of securing better nutrition and requests the Council :

“ (1) To invite the Health Organisation of the League of Nations to continue and extend its work on nutrition in relation to public health ;

“ (2) To instruct the technical organisations of the League of Nations, in consultation with the International Labour Office and the International Institute of Agriculture, to collect, summarise and publish information on the measures taken in all countries for securing improved nutrition ; and

“ (3) To appoint a Committee, including agricultural, economic and health experts, instructed to submit a general report on the whole question, in its health and economic aspects, to the next Assembly, after taking into consideration, *inter alia*, the progress of the work carried out in accordance with paragraphs (1) and (2) above.”

In June 1935, moreover, the nineteenth session of the International Labour Conference had unanimously voted the following resolution :

“ Seeing that nutrition adequate both in quantity and quality is essential to the health and well-being of the workers and their families ;

“ And seeing that in various countries evidence has been brought forward to show that large numbers of persons, both in town and country, are not sufficiently or suitably nourished ;

“ Seeing, moreover, that an increase in the consumption of agricultural foodstuffs would help to raise standards of life and relieve the existing depression in agriculture :

“ The Conference welcomes the attention drawn by the Director in his report to the problem of nutrition and requests the Governing Body to instruct the Office to continue its investigations of the problem, particularly in its social aspects, in collaboration with the Health and Economic Organisations of the League of Nations, the International Institute of Agriculture and other bodies capable of contributing to its solution, with a view to presenting a report on the subject to the 1936 session of the Conference.”

* * *

To give effect to the first paragraph of the Assembly resolution, the Health Committee appointed a Technical Commission, which held its first session in London from November 25th to 29th, 1935, and set forth its findings in document C.H.1197, entitled “ Report on the Physiological Bases of Nutrition ”.

To give effect to the second paragraph of that same resolution, the Secretary-General, in November 1935, requested Governments to forward to the Secretariat, in the form of a general statement, any information which appeared to them to have a direct bearing on the improvement of nutrition. He drew the special attention of Governments to a number of particular questions :

(a) The practical measures taken by the central Government and by the local authorities to ensure an improved dietary for various

population groups, such as : mothers and infants, school-children, inmates of institutions, industrial workers and agricultural labourers, unemployed, persons in receipt of relief, etc. ;

(b) The work of private organisations (co-operative societies, employers' and workers' associations and the like) in the same field;

(c) The means at the disposal of the public authorities for testing the prevailing level of nutrition, more especially with a view to ascertaining whether certain parts of the population are under-nourished ;

(d) The methods employed for the collection of information on nutrition and the form in which such information is compiled (by occupational groups, income groups, etc.) ;

(e) The dietary standards laid down for certain groups of persons whose food is provided by the public authorities—*e.g.*, army, navy, employees and workmen, inmates of institutions, etc. ;

(f) Action taken by public authorities or private organisations to disseminate among the public a knowledge of the principles and practice of rational nutrition.

To give effect to paragraph (3) of the Assembly resolution, the Council set up the Mixed Committee on the Problem of Nutrition, which held two sessions in February and June 1936 under the chairmanship of Lord Astor.¹ Members of the

¹ Composition of the Mixed Committee :

The Viscount ASTOR, (<i>Chairman.</i>)	Member of the House of Lords, Chairman of the Milk-in-Schools Advisory Committee (under the Milk Marketing Board) ; formerly Parliamentary Secretary to the Ministry of Food and later to the Ministry of Health.
Baron G. ACERBO, (Representing the International Institute of Agriculture.)	President of the International Institute of Agriculture ; former Minister ; Dean of the Economic and Commercial Faculty in Rome University.
Professor Thure BJOERKMAN,	Secretary-General of the Royal Agricultural Academy, Stockholm.
M. C. B. BRAMSNAES, (Representing the International Labour Office.)	Director of the National Bank of Denmark ; former Finance Minister, Copenhagen.
M. Ramon CANTOS,	Former Deputy in the Cortes, Madrid.
M. Léon DUPRIEZ,	Secretary-General of the Belgian Economic Recovery Office ; Professor of Political Economy at Louvain University ; Director of the Institute of Economic Sciences at Louvain, Belgium.
Dr. L. FEIERABEND,	President of the Grain Monopoly, Prague.
M. Casimir FUDAKOWSKI,	Senator ; former President of the Polish Federation of Chambers of Agriculture ; Vice-President of the International Agricultural Commission ; Member of the Economic Committee of the International Institute of Agriculture, Warsaw.
M. Enrique J. GAJARDO, (Representing the Child Welfare Committee.)	Head of the Permanent Bureau of Chile at the seat of the League of Nations.
M. Jules GAUTIER,	Vice-President of the International Agricultural Commission, Paris.

Continued on the next page

Technical Commission of the Health Committee, and representatives of the International Labour Office and of the International Institute of Agriculture sit on the Mixed Committee, whose title emphasises the diversity of the interests bound up in the problem of nutrition.

2. PRELIMINARY CHARACTER OF THE PRESENT REPORT.

After its first session, the Mixed Committee was able to obtain some idea of the extent and complexity of the questions into which it had to enquire.

The problem of nutrition is by no means identical in all countries. There are considerable differences between communities, both in the degree and nature of malnutrition

Continued from previous page:

M. Edo MARKOVIC,	General Manager of the Privileged Joint Stock Company for the Export of Products of the Kingdom of Yugoslavia, Belgrade.
Professor E. V. McCOLLUM,	Professor of Biochemistry, School of Hygiene and Public Health, Johns Hopkins University, Baltimore, United States of America.
Mr. F. L. McDUGALL,	Economic Adviser to the Australian Government, London.
Professor Dr. Ed. MELLANBY,	Secretary-General of the Medical Research Council, London.
M. G. DE MICHELIS,	Ambassador; Senator; Member of the National Research Council, etc., Rome.
Professor Edwin G. NOURSE,	Director of the Institute of Economics, Brookings Institution, Washington.
Dr. Carlos A. PARDO,	Commercial Counsellor at the Argentine Legation in Switzerland, Berne.
M. H. QUEVILLE,	Senator; former Minister of Agriculture and former Minister of Public Health, Paris.
M. VAN RIJN, (Representing the International Institute of Agriculture.)	Vice-President of the International Institute of Agriculture, Rome.
M. STEVENS,	Engineer; Inspector of Agriculture; Head of the Agricultural and Economic Information Department of the Ministry of Agriculture, The Hague.
Miss Faith WILLIAMS, (Representing the International Labour Office.)	Chief of the "Cost of Living Division", Department of Labour, Washington.

* * *

M. HALBWACHS, Professor at the Sorbonne, Paris, took the place of Miss Faith Williams at the first session, and of M. Bramsuaes at the second session.

M. Jan WSZELAKI, Economic Counsellor at the Ministry for Foreign Affairs, Warsaw, took the place of M. Fudakowski at the first session.

Mr. Warren C. WAITE, Professor at Minnesota University (United States of America), and Mr. Harold B. ROWE, of the Brookings Institution, Washington, took the place of Professor Nourse, the former at the first session and the latter at the second session.

M. de Michelis and Baron Acerbo did not attend the second session.

The representatives of the International Institute of Agriculture were assisted by:

M. AUGÉ-LARIBÉ,	representing France and the French colonies on the Permanent Committee of the Institute.
M. BRIZI,	Secretary-General of the Institute.
M. DORE,	Head of the Bureau of General Statistics.
DR. PAVLOVSKY,	Head of the Bureau of Economic and Social Studies.

and in the extent to which the national resources would allow of improvements. In every country, therefore, there is a problem to be solved, a defect to be corrected, a task to be undertaken.

On consideration of the studies and investigations so far undertaken by the Secretariat of the League (especially the Health Section), the International Labour Office and the International Institute of Agriculture, the Mixed Committee has been forced to recognise that it is impossible to cover at the outset the vast field of work embraced by the terms of reference given to it by the Assembly.

Knowledge of the conditions and of the means of action available in Europe and in countries of Western civilisation is already sufficient to enable a practical study of nutrition to be begun at once. In the Far East, in Asia and in Africa, however, preliminary investigations need to be undertaken, and hence the enquiries instituted on behalf of the Mixed Committee have been limited so far to the countries of European and Western civilisation. Arrangements for investigations in tropical regions and Far-Eastern countries have already been started by the League Health Organisation, and the Mixed Committee desires to draw the Assembly's attention to this fact and hopes that the Governments concerned will give their full support to this work.

The Committee has accordingly decided to lay before the 1936 Assembly a preliminary report, but hopes to be in a position to submit a general report to a later Assembly.

Since it is clear that the whole nutritional question depends upon the relation of adequate nutrition to public health, the Mixed Committee decided that, in this interim report, it was essential to study this aspect of the problem as fully as circumstances permitted. It has therefore devoted a major part of this report to Nutrition and Health (see Chapter II). It has only been able to place on record its preliminary observations on the economic and agricultural aspects of the problem, but hopes to be in a position to elaborate them in its final report.

3. NUTRITION STATISTICS.

The Mixed Committee has found it necessary to give special attention to the availability of adequate statistical information,

desiring that its findings and recommendations should be based upon a firm foundation.

Accordingly, the Mixed Committee enlisted the help of the International Institute of Agriculture, and set up a Sub-Committee on Nutritional Statistics, which met at the International Institute of Agriculture in March 1936.¹

Statistical evidence is of special importance for the measurement of the adequacy or deficiency of the nutrition of different categories of persons in any country ; for estimating the trend of national consumption of different foodstuffs and changes in popular dietary habits ; for estimating the additional demand for food products which would be entailed by an improvement in the prevailing level of consumption in any country.

Unfortunately, the Sub-Committee found that nutrition statistics are very often incomplete or defective, and that this is especially true of some kinds of food, such as milk, vegetables and fruit, with the consumption of which the Committee's enquiries are most closely concerned.²

In spite of these difficulties, the Sub-Committee asked the International Institute of Agriculture :

- (a) To furnish such information as exists on the consumption of cereals, sugar, meat, milk and other dairy products, poultry and eggs, fresh vegetables and fruit ;
- (b) To show as far as possible the trends of production, consumption and prices of these products in those countries for which reasonably complete statistics are available ;

¹ The report of the Sub-Committee will be found at the end of Volume III.

² It is shown, for example, that, while the statistics for the production of cereals are fairly complete, it is difficult to obtain good statistics of consumption. The data on sugar production and consumption are adequate. Those on such an essential commodity as milk, on the contrary, are very imperfect, as very few countries possess regular annual returns of milk production. The total production figures are often arrived at indirectly from the number of milch cows and the estimated average yield per cow. As these yields vary greatly, the margin of error in these statistics is serious. The absence of adequate production statistics makes it impossible to obtain reliable estimates of national consumption. Statistics on butter and cheese are slightly more satisfactory than those on milk, but they are nevertheless inadequate. There are reliable statistics on poultry and eggs for only a very small number of countries. The statistics on potato production are fairly complete and accurate, but it is difficult to obtain statistics of consumption. It is very difficult to obtain statistics of the production of fresh vegetables, as such large quantities are grown in gardens. The position with regard to certain vegetables, such as onions and tomatoes, is more satisfactory in a few countries which produce large quantities. The consumption of exotic fruits can be estimated from the foreign trade figures ; only rudimentary information is available for apples, pears, etc.

(c) To obtain municipal data on the quantities of milk and fresh vegetables entering large cities and to utilise these data to supplement the information referred to under (a) and (b) ;

(d) To continue its established policy of improving agricultural statistics, giving special attention to the deficiencies in the material now available on the protective foods¹, and to draw the attention of each Government to the particular directions in which improvement is desirable ;

(e) To collect data bearing on the financial aspects of the assistance received by the national agriculture of various countries and on the effects of such assistance on the production, imports and exports of foods ;

(f) To collect and study wholesale and retail prices, particularly of the protective foods, and to relate such price data to the trends in production and consumption in various countries.

4. THE VARIOUS VOLUMES OF THIS REPORT.

This report to the Assembly comprises four volumes :

Volume I, Interim Report of the Mixed Committee on the Problem of Nutrition (the present volume), is the report proper, embodying the suggestions made by the Mixed Committee to the Assembly and giving a general idea of the problems involved.

Volume II, Report on the Physiological Bases of Nutrition, contains a report drawn up by the Technical Commission of the Health Committee.

This Commission first met in London in November 1935. The conclusions arrived at were submitted to the first session of the Mixed Committee and formed the starting-point of its consideration of the scientific aspect of the nutrition problem (see Chapter II below). This is now presented in a revised and amplified form as a result of a meeting held by the Technical Commission in June 1935.

Volume III, Nutrition in Various Countries, gives the substance of the actual data received by the Committee, including the essential portion of the information contained

¹ See Chapter II.

in the replies of certain Governments to the Secretary-General's Circular Letter of November 30th, 1935. It also contains a survey of developments in popular dietaries in a number of countries since the war.

In addition, there will be found in this volume the report of the Sub-Committee appointed by the Mixed Committee to examine the available statistical material concerning the consumption of foodstuffs.

Volume IV, Statistics of Food Production, Consumption and Prices: A Documentation prepared by the International Institute of Agriculture, contains a valuable documentation assembled by the Institute at the request of the Mixed Committee, reviewing the available statistics of food production, consumption and prices.

* * *

Reference may also be made to the report submitted by the International Labour Office to this year's session of the International Labour Conference, entitled "Workers' Nutrition and Social Policy",¹ a brief account of which will be found in Chapter V below. This report makes an important contribution to the material now available for the study of the nutrition problem.

¹ International Labour Office: Studies and Reports, Series B (Social and Economic Conditions), No. 23: "Workers' Nutrition and Social Policy", Geneva, 1936, 249 pages.

Chapter I.

GENERAL SURVEY OF THE NUTRITION PROBLEM.

I. IS THERE A NUTRITION PROBLEM ?

Leaving the more backward countries out of account for the time being, we have to ask at the outset of this enquiry whether there is, in fact, in the countries of Europe and those of Western civilisation in other continents a general or widespread deficiency in popular nutrition.

Evidence on this question has been received from many sources. First of all should be mentioned the authoritative statement of the Technical Commission of the Health Organisation. The members of this Commission express their agreement with the conclusions of the Burnet-Aykroyd report that " deficiencies in important nutrients are a common feature of modern diets and that these deficiencies usually occur in the protective foods (foods rich in minerals and vitamins) rather than in the energy-giving foods (proteins, fats and carbohydrates) ".

Governments' replies to the questions submitted to them by the Secretariat contain much information as to the state of nutrition in a large number of countries. This information has been amplified by statements received from members of the Mixed Committee on Nutrition, while more detailed examination of the results of special studies and scientific investigations has been made by the International Labour Office. In some countries, investigations of great importance have recently been undertaken. The volume of available information is thus, in the aggregate, considerable and comprehensive. The evidence that inadequacy of diet is widespread is conclusive. Malnutrition is manifest in the prevalence of rickets, scurvy, poor musculature, teeth of poor structure, anæmia, chronic fatigue, poor condition of the skin and subnormal growth and weight, to mention the more easily observable symptoms.

In examining the evidence, it is at once clear that the nutrition problem takes very different forms according to the

circumstances of particular countries. There is, unfortunately, in many countries a nutrition problem due to the world crisis and the diminution of normal economic and commercial activity, resulting in widespread distress.

Over large areas of both agricultural and industrial countries are to be found distressed groups of population, especially where the incidence of the depression has been most severe. This is true even in such well-to-do countries as the United Kingdom and the United States of America.

Defective nutrition among wide sections of the population is not, however, limited to countries or areas specially affected by the economic crisis, such as impoverished urban communities or depressed agricultural areas. In the light of modern knowledge, it is abundantly clear that in no country does the whole population attain the standard scientifically desirable in the interests of health. Much exact information exists as to dietary habits of different sections of the population in a number of individual countries, and on the basis of such evidence it is manifest that defective nutrition is to be found among large sections of the population even in well-to-do countries, with the inevitable consequence of the prevalence of deficiency and the unsatisfactory standard of physique of the population as a whole. The high proportion of rejections on physical grounds of recruits for the army, even in well-to-do countries, is a typical illustration of a situation which prevails widely.

In the United States of America, it was thought, until recently, that the standard of life was high, especially having regard to recent improvements in the popular dietary, more especially with regard to the consumption of milk and other protective foodstuffs. Nevertheless, recent enquiries by scientific workers have shown that a number of persons are insufficiently fed and a much larger number badly fed. Even in 1928-29, which was a period of great prosperity, most families were living on inadequate diets. Since the economic depression, the position has become worse.

In the United Kingdom, a recently published report¹ on the adequacy of diet in relation to income shows that, dividing the population into six groups according to income, the average diet of the lowest income group, representing 10% of the total population, is inadequate for perfect health in all of the constituents considered. The diet of the next

¹ "Food, Health and Income", by Sir John Boyd ORR (Macmillan).

group, representing 20% of the population, is adequate only in total proteins and total fat. The third group, containing another 20% and living at a better income level, has a diet adequate in energy value and protein and fat; but even the diet of this group is, on the average, below the standard in mineral and vitamin constituents.

It thus appears that, in the United Kingdom, the diet of at least 50% of the population falls short of the desirable standard; and it is estimated that to raise the consumption of this low-income half of the population merely to the level of the next group would require an increase of 16% in the amount of milk consumed, 15% in that of butter, 18% in eggs, 12% in meat, as well as a 25% increase of expenditure on fruit and vegetables. Even then the diet would leave room for considerable improvement.

The analysis of family budgets carried out by the International Labour Office, the results of which are published in "Workers' Nutrition and Social Policy", demonstrates the existence of similar conditions in other countries.

2. THE NEW TEACHINGS OF SCIENCE.

During the last thirty years, scientific research in the field of nutrition has led to findings of great significance. In November 1935, these findings were reviewed by a technical international Commission of physiologists convened by the Health Organisation of the League, which reached full agreement on certain principles and recommendations as to the composition of a rational diet. The conclusions arrived at, which are explained in greater detail in the chapter which follows, constitute a scientific formula for an *optimum standard of human diet*, which incorporates the results of modern research and is intended to provide an adequate supply of nutritive elements for all the physiological requirements of the human body.

It is known, for example, that there are twelve inorganic mineral elements which play an important part in human nutrition, since their absence produces definite deficiency diseases. Then there are the vitamins, substances which exist in the human body in minute quantities, but have a highly important influence on health. There are at least nine of these vitamins, and the absence of any one gives rise to a specific disease characteristic of defective nutrition.

For these reasons, special emphasis is laid by modern teaching on the great importance of certain "protective" foods—that is, foods rich in the elements necessary to prevent the incidence of the specific maladies referred to. These protective foods consist mainly of products of dairy farming and of the market garden, and include meat, milk, eggs, cheese, vegetables, fruit and potatoes. Assuming that adequate provision is made in the composition of the diet for the supply of these protective foods, energy-bearing foods, such as cereals, vegetables, fats and sugar, are recommended for supplementary use so as to make up the calorie requirements of a complete diet. Of all the protective foods, milk is regarded as of outstanding importance, since it is a food containing most or all of the materials necessary for growth and for the maintenance of life, and provides these in a form ready for immediate utilisation by the human body.¹

The ill-effects of improper feeding are of special gravity in the case of pregnant women and children. One reason for this is obvious—namely, that there is a greater need for good nutritional material during the period of growth than for the maintenance of a fully grown person. Even more important is the fact that tissues and organs of the body are often badly constructed if a proper supply of essential chemical substances, such as are present in protective foods but are deficient in energy-bearing foods, are not supplied during the period of rapid growth. Some of these defects are not only serious but irreparable, even when followed by a period of proper feeding. Individuals may, and often do, bear the stigma of defective feeding in childhood throughout life.

As the new knowledge now available becomes widely diffused and its significance to individual health and national prosperity is realised, it is certain that progressive changes in the existing dietary practices of many countries will be brought

¹"Milk contains the energy-giving nutrients, protein, fat and carbohydrate; all the known essential vitamins; calcium, phosphorus, iron, sulphur, iodine, magnesium, potassium, sodium, chlorine and copper, some of the physiological rôles of which are known; and a number of other elements, present only in minute amounts, such as manganese, zinc and fluorine, the exact functions of which are not fully understood, but which would seem to be as necessary for normal nutrition as any of the other constituents." — See "Memorandum by the Advisory Committee on Nutrition on the Nutritive Value of Milk", issued by the Ministry of Health and the Secretary of State for Scotland, March 1936.

about through the gradual development of popular demand in the directions indicated by science as desirable. This may, indeed, lead to strengthening the demand for bread made from the less highly milled cereals and for the liberal use of potatoes, on account of their protective contents. On the other hand, less importance may be attached to the use of sugar, which contains no vitamins or mineral salts, while, indeed, its excessive consumption diminishes the appetite for more important protective foods. It must be realised that instinct and appetite alone cannot be regarded as reliable guides in the choice of food.

Much work and time will be required before these scientific principles can be fully applied. The principles themselves are not worked out in terms of dietary practice, and in many cases alternative sources exist from which to secure particular necessary elements. Practical application, therefore, must vary widely, according to the conditions which exist in different countries and communities, and the different resources in food supplies possessed by the inhabitants of different regions.

The objective must be, not to attempt to prescribe a single type of diet for all the peoples of Europe and other countries of Western civilisation, but to promote the development of agricultural production along the lines which science makes possible, having regard to differences of soil, climate, etc., with a view to providing the most efficient food supply, taking into consideration the traditional dietary habits of the people.

There are, of course, very wide contrasts in the customary diets in different parts of the world, consideration of which will serve as a reminder of the extent of man's primary dependence upon local food supplies. The extent of this variety of practice is illustrated by information summarised in Volume III of this report.

It is known, for instance, that Esquimaux can live on nothing but *meat foods*—on condition, however, that they consume all parts of the animal, the liver, the kidneys, the brain, the glands, the blood, etc., as is also the habit of beasts of prey. It is an established fact that the human body cannot subsist solely on the muscular parts which contribute most of the meat commonly consumed in temperate climates.

In Arabia, another type of limited diet is found. Here 70% of the energy requirements are supplied by *sour milk*; to this basic food, there is added from time to time a small quantity of barley, a few dates, or

the like. The Bedouins scarcely ever eat meat, yet are well able to subsist on their limited customary diet—indeed, their teeth are far better than those of Europeans, since the requisite protective elements are all provided.

Again, the populations of the hot countries of Asia, which know no cereals other than *rice*, are able to subsist on their diet by adding certain foodstuffs such as cabbage or bamboo shoots, a few figs, eggs and pork, thereby making up for the deficiency of calcium, vitamin A and protein which characterises the cereals. Such a dietary is, however, far from ideal. In these countries, the physical resources of the women are severely taxed by childbirth; the mothers' milk is of poor quality and infant mortality exceedingly high. Furthermore, such races have been observed to age rapidly and have a comparatively short average length of life.

These instances are extreme examples of possible wide divergencies of diet. They illustrate, however, the wide limits of dietary which are compatible with existence.

3. THE HEALTH OF THE CHILD—THE KERNEL OF THE PROBLEM.

Many of the most difficult problems affecting adult nutrition at the present time arise in large measure from the effects of the economic crisis in areas, whether industrial or agricultural, which are impoverished by reason of commercial dislocation and trade restrictions. Viewing the nutrition question as a whole, however, the greatest emphasis deserves to be laid on one particular aspect—namely, the nutrition of children. The national interest which attaches to securing an adequate diet for young children springs from the fact, now fully recognised, that only by adequate nutrition in the earliest years of life can the health and full development of the future citizen be assured. Pregnant women, nursing mothers, infants and young children must be considered from a nutritional standpoint as the most vulnerable portion of the population, in the sense that damage inflicted in childhood by bad food cannot be subsequently repaired.

It is definitely established that many of the ill-effects which result from deficient diet in childhood, such as rickets, bad teeth and nutritional anæmia, are avoidable by adequate provision of ordinary foods, the most important of which is milk. There is

abundance of experimental evidence to show that milk is the most valuable food known for promoting health and growth in children and in preventing characteristic ailments due to nutritional defects. Observations on the development of children receiving additional milk show the definite improvement in health and in the rate of growth which is attained if the principles of rational nutrition are observed. An abundant supply of milk is therefore an essential item in the diet of children in order to secure a sound physique and good health. There is, unhappily, no less abundant evidence that very few countries, if any, have as yet attained the standard which secures to the child population as a whole this essential basis for sound nurture.

In the light of these facts, attention should chiefly be concentrated on ensuring adequate nutrition for the young. Remedial treatment for the older age-groups, who must often be regarded as "damaged goods", must also have its place in the planning of a nutritional campaign; but it is the preventive rather than the curative aspect of the problem which should be given the first place. From a national standpoint, the cost of the investment so made in the health of the children will be more than compensated by the improved vigour and physique of the adult population.

4. EDUCATION AND POPULAR INSTRUCTION.

Ignorance of the principles and main features of the modern science of nutrition is one of the commonest causes of deficiencies in nutrition. That is abundantly proved by the information at the Committee's disposal. Ignorance is prevalent, not only among the poorer classes of the population, where it aggravates the ill consequences of lack of resources; investigations made in the wealthiest countries have revealed the fact that defective, inadequate or ill-considered nutrition exists, and that even among the wealthier classes there is ill-considered nutrition due to inadequate knowledge.

In the Committee's opinion, effective teaching and propaganda are likely to produce important and rapid results. The changes

that have taken place in recent years in the dietary habits of a number of countries bear witness to this.

The work of spreading knowledge may be conducted through many and widely different agencies and by widely different means (universities, elementary schools, secondary schools, schools of domestic science, demonstrations in various forms, publications, wireless, cinema, etc.). The means adopted in any country will have, therefore, to be carefully co-ordinated if satisfactory results are to be obtained. The central authority referred to in the introductory chapter of this report will have an important part to play in this respect.

Exchanges of ideas and experience on an international scale could do much to improve the methods of the individual countries. The Mixed Committee considers that it would be desirable to organise meetings for this purpose, perhaps with the collaboration of appropriate international institutions which possess an organisation enabling the public at large to be reached.

The methods followed will naturally vary according to the characteristics of the particular country. Nevertheless, experience shows that the progress of science can gradually be embodied in dietary habits and practices by the following means :

(a) *Doctors and Hygienists.*

Until quite recently, in most faculties of medicine, very little space was allotted to nutrition in the curriculum of the basic sciences and clinical medicine. In clinical medicine, the student learnt little more than the diagnosis and treatment of the most characteristic diseases of the digestive organs and the principal diseases of nutrition, such as diabetes and gout. Only for the nutrition of infants was an adequate place found in medical training. The teaching of preventive medicine, and hence also instruction in nutrition as a form of preventive medicine, is still in its initial stages.

The time has now come to introduce rational nutrition into curricula and examinations. This should be possible without unduly taxing the resources of either. It is to-day recognised that physiology (with biophysics and biochemistry) is the

fundamental basis of medicine, and there is a tendency to give this subject ampler treatment. More attention should be devoted than in the past to questions relating to protective and energy-bearing foods, vitamins and the modern science of nutrition, and practical applications should be found for theoretical knowledge.

Clinical instruction may include, not merely characteristic nutritional diseases, but also pre-morbid conditions and the general effects of malnutrition—in short, the nutritional aspect of preventive medicine. The student can be initiated into the technique of dietary surveys, family budgets, and the adjustment of family incomes to nutritional requirements. In nutrition, as in the other branches of curative and preventive medicine, medical practitioners must be sufficiently well trained to be effective agents of progress in the family and in the community at large.

The fundamental education of students must be such that, with additional knowledge which they can acquire in advanced courses, they can become useful advisers as medical officers to schools (elementary, secondary, and higher), public institutions (hospitals, sanatoria, the army, prisons, etc.), industrial and commercial concerns, and private associations, and can help to give instruction in household management.

A doctor wishing to specialise in nutritional hygiene should be able to obtain the advanced instruction he needs. This instruction should be partly scientific (in the form of laboratory research) and partly social (in the form of statistics and, especially, surveys of population groups).

In the sphere of social hygiene, specialised visiting nurses exist in many countries as intermediary agents between the doctor and the general public. Their rôle can easily be extended to the sphere of nutrition. The instruction given in nursing-schools should make them capable of giving practical advice on the choice of food, the way in which it should be cooked, etc.

(b) *Education of the General Public.*

This should begin in the primary school, with elementary instruction in physiology in a very simple form. The child should be taught the nutritive value of the principal foodstuffs

(milk, bread, green vegetables, fruit) ; school meals will teach him dietary habits based on reasons of health. This instruction and these habits will quickly spread from the school to the family.

Secondary schools, special schools (domestic economy, vocational schools, etc.) should take account in their curricula of this essential factor of social progress.

There is no need to enumerate the methods of reaching the general public. They are of many kinds and are well known. The public can be given pamphlets, books, propaganda articles in the Press ; it can listen to lectures and wireless talks, and can be shown posters, pictures and films. The aim should be to make recent discoveries in the science of nutrition available to everyone in a simple form ; to spread such teaching among ever wider circles and gradually to convert the results of scientific researches from current opinions into daily habits. By these various means, the housewife will be taught how to choose food and how to prepare wholesome meals which are suited to the physical needs of her family and are at the same time economical.

5. ECONOMIC CONSIDERATIONS.

The Committee proposes to deal more fully with the economic and agricultural aspects of the problem of nutrition in its final report. It has thought it desirable, however, to insert two brief chapters on these subjects in this interim report (see Chapters IV and V below), though these are not intended to do more than indicate the nature of the economic and agricultural problems that arise for study.

As has been stated above, the nutritional adequacy of the diets of various groups of population is mainly dependent upon the income of those groups. The purchasing power of every individual is a function at once of his money income and of the level of prices. A fall in retail prices might, therefore, be expected to improve nutrition. This would, indeed, be so if the reduction in retail prices was due to a reduction in the costs of distribution. But in recent years that fall has been due, to a very large extent, to the general economic depression and, in particular, to the depression in agriculture. It has been

accompanied by a still greater reduction in income of many classes of the population, and this, in turn, has led to serious malnutrition amongst certain classes.

A question which has often attracted attention and which has become accentuated by the effects of the depression is the large margin or spread which is often found to exist between the wholesale and the retail prices of given commodities. Examples of abnormal margins are not hard to find in any country, whether due to permanent or to temporary conditions. Such contrasts have become more prominent in recent years in consequence of the fall in wholesale prices due to the crisis—at a time when charges for transportation, handling and marketing, rent of retail shops and other overhead costs have remained stationary or have changed but little. The glaring contrasts in value which are often brought to notice create a popular discontent shared by producer and consumer. The aim must be to secure the better organisation of the machinery of distribution so as to ensure that the consumer enjoys the benefit of the lowest possible price consistent with the adequate remuneration of producer and distributor.

There remain a number of difficult questions as to the influence of economic policy in any country upon the level of food prices, especially where measures of a fiscal or protectionist character intended to restore and maintain agricultural prosperity are the accepted basis of national policy. Attention has been drawn to the very wide differences which exist between the cost of particular food materials and products in different countries, a fact which seems to suggest that consumption in certain communities is restricted, since they are deprived as a result of such policies of the benefits of abundant and cheap supply.

This particular aspect of the nutrition problem is an important one, and its proper understanding is essential in a study of the influences which impede nutritional progress. Clearly, every effort must be made to harmonise the policy of promoting production with the policy of safeguarding nutritional interests, for policies which limit the abundance of food supplies at low prices must in the long run react unfavourably upon producers. It should be very seriously considered whether some of the

resources at present devoted to the encouragement of production might not beneficially be directed towards stimulating increased consumption.

6. AGRICULTURE.

A widespread improvement in the nutrition of the general population cannot but affect the demand for food materials and, therefore, agricultural activity, national and international. This is a region in which much careful investigation is required before sound conclusions can be reached. Scientific progress and improvement in agriculture make it possible to bring about rapid and important developments, and new methods and new processes are available to facilitate the adaptation of agricultural technique. Changes in demand or augmented demand for particular products will have important reactions on national agriculture, particularly since the forms of food to which attention is specially directed consist of products which by their nature are especially suitable for local production. Fresh milk, fresh vegetables and fresh fruit are clearly best produced in the neighbourhood of the market where they will be consumed. It is no less significant that the characteristic structure of agriculture in densely populated countries is as a rule particularly well suited for the development of production of this character. Should this movement spread, therefore, and lead to a substantial change in agricultural structure, it may help to bring about, in some measure, the restoration of international trade in foodstuffs which can be more advantageously and economically secured by importation. This aspect of the nutrition problem has thus many encouraging features.

7. NATIONAL NUTRITION POLICY AND SOCIAL WELFARE.

The economic interests of the community as a whole are bound up in maintaining the standard of physical efficiency among the people and laying the foundations of the health and well-being of future generations. Moreover, there is a definite social and political interest in the accomplishment of this task, owing to the well-ascertained relationship between

the deficiency of food and especially of protective foods and social unrest.

The relief of destitution, sanitation and education have long been recognised as social obligations. Remedies for unemployment, whether by insurance, by direct maintenance or by the provision of work, have in more recent times become one of the leading preoccupations of Governments. At the same time, there has been a great extension of the public medical services, together with action to promote industrial welfare, better housing and the care of maternity and childhood. Progressively, stress is laid on preventive as contrasted with curative treatment for social maladies.

This vast network of national endeavour has for its underlying aim the promotion of individual well-being. More and more clearly it is seen that rational nutrition is a primary requirement. A new emphasis has thus been given to the nutrition aspect of the social problem, and the recent advances made by the science of nutrition have given a new specific direction to the campaign for social betterment.

It is now beginning to be realised that, in order to secure a proper co-ordination and direction of the public activities involved, it is necessary that the campaign for better nutrition should take its place as an integral part of national policy.

A *national nutrition policy* requires the supervision of some central authority having special responsibility for this matter, in order to utilise to the best advantage the teachings of science and to apply them in the practical field. There must be co-operation between bodies engaged in research on the one hand and authorities and organisations responsible for the administration of public assistance and for education and popular instruction on the other. There must equally be co-ordination of action in the economic field, so that measures affecting the supply of food may be brought into harmony with nutritional requirements. On this side of its work, the authority should be entitled to be consulted in matters affecting agricultural policies and the importation of foodstuffs. An effective means, for example, of bringing nutrition and national economic policy into harmony would be to empower the authorities responsible for the conduct of nutrition policy to help in an advisory capacity

whenever a Government is about to take important economic decisions affecting nutrition.

The campaign for improved nutrition launched at last year's Assembly would have an excellent prospect of achieving its object if Governments, when called upon to take important decisions affecting production and trade—both national and international—should henceforward concern themselves as much with maintaining the nutritional basis of public health as with safeguarding the legitimate interest of producers.

At its first session, in February 1936, the Mixed Committee, being convinced of the great importance of central responsibility and direction, adopted and gave publicity to the following recommendation :

“ In view of the importance of carrying on the studies and researches which can best safeguard human health by means of a better nutritional hygiene, the Mixed Committee hopes that, in as many countries as possible, suitable means will be found for centralising the documentation, information and measures for the improvement of nutrition in order to gain a better knowledge of the influence which has been and may be exercised in the different countries by the scientific results already achieved. With this end in view, wherever organisations adapted for this task do not yet exist, it is hoped that national committees or other suitable bodies will be set up under the authority of the Government, or in relation with the latter, and in liaison with the scientific institutions, in order to investigate on a national plane :

“ (i) What centres for the study of and scientific research into human nutrition are already in existence.

“ (ii) What action is proposed and what steps appear to be desirable for the development of these studies or researches.

“ (iii) What application has been made of the scientific findings already established, in particular :

“ (a) By instruction in the form of lectures, travelling exhibitions, radio, etc. ;

“ (b) By instruction in domestic economy ;

“ (c) By the education of doctors, teachers or stewards, military supply service officers, hotel-keepers, etc. ;

“ (d) By the supervision of diets in educational establishments, barracks, public relief institutions, in which a rational diet may be introduced by a decision of the public authorities ;

“ (e) By the distribution of certain foods to children ;

“ (f) By any other action taken up by the State or by occupational or other groups.

- “ (iv) What should be done in future to improve the nutrition of the country.
- “ (v) The probable consequences, and particularly the new requirements from the point of view of the food supplies of their country (reduction or increase in the consumption of certain products), of the application of a normal dietary drawn up in accordance with the Technical Commission's conclusions.”¹

The Mixed Committee has not attempted to give definite advice as to the lines which this policy should follow in the various countries. That must necessarily depend on circumstances, administrative methods and national traditions.

Once it has been recognised that one of the collective duties of the State is to exercise general supervision over the nutrition

¹ In some countries, there is already a central authority or body responsible, in some degree, for advising upon or directing the different activities in the sphere of national nutrition. As examples and without attempting to give a complete list, the following organisations may be mentioned :

<i>United Kingdom:</i>	Advisory Committee on Nutrition.
<i>Bulgaria:</i>	Rational Nutrition Commission.
<i>Denmark:</i>	Advisory Nutrition Committee.
<i>United States of America:</i>	Department of Agriculture : Bureau of Home Economics. Department of Labour : Bureau of Labour Statistics and Children's Bureau. Department of the Treasury : Public Health Service.
<i>Italy:</i>	National Research Council.
<i>Mexico:</i>	Nutrition Research Institute.
<i>Poland:</i>	Polish Health Association.
<i>Sweden:</i>	Social Board.

Since the Mixed Committee was constituted, it has been learned that several other countries have decided to set up national nutrition committees or councils.

<i>Australia:</i>	The Commonwealth Government has established an Advisory Committee to examine the existing diet of the various sections of the population, collect data, and report upon any defects in Australian conditions and possible remedies.
<i>Canada:</i>	The Government of Canada has set up an Interdepartmental Committee to consider questions arising out of the League enquiry on nutrition.
<i>Finland:</i>	The Government has appointed a Committee of Enquiry in the matter of improving the popular diet and increasing the consumption of home agricultural produce.
<i>France:</i>	The French Government has set up a National Committee for the Study of Nutrition, consisting of four commissions—a scientific commission, a commission on education and practical application, an economic commission, a commission on the inspection and control of foodstuffs.
<i>India:</i>	The Government is contemplating the establishment of a Nutritional Advisory Board.
<i>Netherlands:</i>	Consideration is being given to the advisability of establishing a mixed official committee representing various public services which will deal with the related questions of nutrition, agriculture and public health.
<i>Uruguay:</i>	A National Committee for Rational Nutrition has been created.
<i>Yugoslavia:</i>	The Ministry of Social Policy and Public Health has established a National Committee to study the nutrition problem. This Committee consists of representatives of the authorities concerned and of private organisations.

of the people as a whole, and especially to guarantee to those groups in which the damage inflicted by malnutrition has the most serious consequences the minimum of nutrition required, an appropriate organisation is obviously needed to carry out those tasks in close co-operation with the Government of the country.

The duties of those bodies which the Mixed Committee advocates are essentially national. It is obvious, however, that their existence in a large number of countries could be extremely useful as a basis for international collaboration.

Chapter II.

NUTRITION AND HEALTH.

I. INTRODUCTION.

The progress made in medical science and hygiene in the second half of the nineteenth century led Governments to the realisation that great possibilities of improvement in national health were within the reach of mankind. The knowledge of the infective nature of many maladies indicated ways of stamping out epidemic disease. Means were discovered of making the human environment more healthy and of fortifying the body by physical training, which became increasingly popular. It was confidently hoped that the ancient ideal of *mens sana in corpore sano* would become the heritage of all human beings if the work thus begun was pursued further with devotion and enthusiasm.

But this very work has revealed the extent of the ills which it has to cure. In spite of the application of the knowledge of medicine and hygiene, the physical condition of a large part of the human race is still far below the accepted standard, and the more recent advances in medical science have established the fact that this inferiority is largely due to imperfect nutrition.

In the great war, nations which were obliged to enroll large numbers of very young soldiers were appalled at the poor quality of the recruits that were presented for service. Medical inspection of schools revealed then and still reveals a large number of sickly children below the normal standard of development for their age. The considerable decline in infant mortality in some countries only renders more impressive the persistence of high infant mortality in others. Certain epidemics display a destructive power that seems due, not solely to the virulence of the infective agent, but also to a lack of resistance in the population attacked.

At the same time, the discoveries of the last thirty years leading to the "newer knowledge of nutrition" show with ever-increasing certainty that inadequate nutrition plays an important part in infant mortality and can account for the excessive proportion of under-developed school-children and adolescents and the poor health and small output of a large number of workers. Deficiencies in diet and diseases of nutritional origin can be observed, not only among urban populations, but also among dwellers in country districts, and not only in poor or primitive countries, but also in the rich nations with an old and highly developed civilisation.

Interest having thus been awakened as to the importance of correct nutrition for the public health, investigation of the existing conditions has spread to every quarter of the globe, the results of which have created the suspicion that a large part, possibly the greater part, of humanity may be ill-fed or underfed.

2. THE PRINCIPLES OF CORRECT NUTRITION.

The diet must supply the necessary substances for the growth and repair of the organism and energy for the production of animal heat and muscular work. The organism being in some respects comparable to a heat-machine which converts fuel into calories, its energy requirements may be estimated in calories. The fuel or energy needs of the body are supplied by the fats, carbohydrates and proteins of the diet, the proteins having the additional function of building new tissue for the growing animal and of repairing tissue wastage in the adult. For these purposes, the proteins contained in animal foods are of better *quality* than those contained in foods of plant origin, the proteins of milk, eggs and glandular animal tissues (liver, kidney) being specially valuable. The diet should contain a certain proportion of foods providing "good" protein, and it is usually held that about 50% of the protein in a diet should be of animal origin.

Recent nutritional research has stressed the great importance of other essential food elements, vitamins and minerals, which are also indispensable, though required in relatively small quantities.

Vitamins.

The vitamins, of which about ten have been differentiated, have been called food hormones,¹ the conception being that, in the economy of the body, they direct the correct utilisation of the other dietary elements. A long list of diseases, including rickets, osteomalacia,² beri-beri, pellagra, dental caries, scurvy, ophthalmia, are now known to be of nutritional origin and to be caused partly or wholly by deficiency of one or more of the vitamins. The vitamins have been extensively studied in the last twenty years, some have been isolated in the pure state, while, of the nature and function of others, knowledge is still very imperfect. The principal vitamins, all of which are necessary to promote growth and maintain health, have been classified as follows :

Vitamin A (fat-soluble). — Deficiency of vitamin A is manifested by certain skin diseases and eye affections, including night blindness, and corneal ulcer leading to total blindness. Populations deprived of vitamin A have a high death rate due to infections of the lungs and intestines.

Vitamin B Complex (water-soluble). — The different constituents of this group are concerned with prevention and cure of beri-beri, pellagra and possibly also of sprue and some forms of anæmia.

Vitamin C (water-soluble). — Necessary for prevention of scurvy.

Vitamin D (fat-soluble). — Required for correct utilisation of calcium salts and phosphates in the nutrition of the growing and adult skeleton, for prevention of rickets, osteomalacia and dental disease. Vitamin D can be taken in the food (in egg-yolk or fish or liver oils) and is also synthesised in the skin by the action of certain of the sun's rays which, in temperate regions, are present only in summer, but are abundant and powerful in their action in tropical and Southern-European countries.

¹ From a Greek word meaning "messenger". Hormones are thus chemical messengers.

² Osteomalacia is a disease in which the bones of adults become largely composed of osteoid tissue which contains very little calcium and is therefore soft. Great deformity of these bones may result.

The nutritional diseases mentioned above are, except in the case of rickets, the outcome of long-continued severe deprivation of the vitamins in question. It is perhaps even more important to emphasise, however, that a less severe deprivation in time or extent or a partially inadequate intake of these essentials may involve ill-defined and disabling departures from health of which the causes may remain undiagnosed.

Minerals.

Recent researches have revealed the great importance of an adequate amount, and a correct balance, of essential minerals in the diet. Of these, calcium, phosphorus, iron and iodine have a special interest. Since a large proportion of the human body is composed of calcium phosphate, forming the skeleton and teeth, the need for ample supplies of calcium and phosphorus is self-evident. A smaller but necessary supply of iron is required for nutrition of blood elements and prevention of anæmia, and a minute provision of iodine is also necessary for the prevention of simple goitre or increase in size of the thyroid gland.

3. "ENERGY-BEARING" AND "PROTECTIVE" FOODS.

A useful division of foods into two classes has been made—(1) the protective foods, those chiefly valuable for providing minerals, vitamins and "good" protein, and (2) the non-protective foods, chiefly valuable as energy-providers. Lack of calories causes starvation, lack of protective foods causes various "deficiency" diseases which may develop in spite of an abundant calorie intake.

The table given opposite contains a rough classification of some of the commoner types of foods into these two classes and shows their relative value as vehicles of energy, good protein, minerals and the more important vitamins.

Among the most important protective foods are the dairy products, especially milk. Then the glandular animal tissues (*e.g.*, liver) and eggs; "fat" fish, green vegetables and fresh fruit are also very rich in vitamins and minerals. Finally, there are certain fats (butter and cod-liver oil) of special value

NUTRITIVE VALUE OF FOODS.

Food	"Good" protein	Minerals	Vitamins			
			A	B	C	D
Milk	++	+++	+	+	+∅	+∅
Cheese	++	++	+	+	—	—
E Eggs.	++	++	+	++	—	++
E Liver	++	++	+	++	—	+
E Fat fish (herrings, etc.)	+		+	+	—	++
Green vegetables, salads	+	+++	+	+	++	—
Raw fruit, fruit juices		+++	+*	+	++	—
E Butter	—	—	+	—	—	+∅
Cod-liver oil	—	—	+++	—	—	+++
Yeast	+	+	—	++	—	—
Meat (muscle)	+	⊥	—	+	⊥	—
Root vegetables, tubers			+*	+	+	—
Legumes (dry peas, lentils)			—	+	—	—
E Cereals, bread (whole-meal)	+	⊥	⊥	+	—	—
E Cereals, bread (white)			—	—	—	—
E Cereals, rice (polished)			—	—	—	—
E Nuts	⊥		—	++	—	—
E Sugar, jam, honey.			—	—	—	—
E Margarine, olive oil and other vegetable oils			—	—	—	—

Highly protective foods

Less protective and non-protective foods

E = foods of high energy or caloric value.
 +++ signifies very rich.
 ++ signifies rich.
 + signifies present.
 ⊥ signifies present in small amount or traces.
 — signifies absent.
 ∅ signifies in summer, when the cows are on pasture.
 * signifies if yellow in colour.

for providing vitamins A and D. Vitamin D, which is sparsely distributed in ordinary foodstuffs, is a vital necessity for young children living in temperate climates or in industrial regions where sunlight is scarce, especially in winter.

Among the prominent energy-giving foods are the fats, the cereals and sugar. The ordinary mixed diet should form a collection of protective and non-protective foods supplying the requisite energy for the body's activity and containing all the necessary protective elements in a correct balance. An unlimited number of different diets could be composed, all of which would satisfy this nutritional ideal. According to the variation in the food supply in different climates and under different circumstances, so the problems of correct nutrition will in practice be met by a large variety of different food combinations. The *principles* of correct nutrition, however, remain the same.

4. SPECIAL DIETARY NEEDS OF DIFFERENT CLASSES AND AGE-GROUPS.

Study of the incidence of nutritional disease has demonstrated the general principle that, where a specific dietary deficiency exists, evidence of its effects will be first apparent in those individuals who are subjected to special physical strain.

If the protective elements are adequate in a diet, the needs for support of extra manual work can easily be met by additional non-protective foods, such as fats and carbohydrates, from which the additional energy can be obtained. Where the supply of protective elements is inadequate, physical strain will often make the defect manifest. Thus, in the history of arctic exploration, where the diet lacked the antiscorbutic elements, men performing hard manual work have frequently been the first to sicken of scurvy. In the East and West Indies, where the diet consists too exclusively of polished rice and is lacking in B vitamins, beri-beri frequently attacks expectant and nursing mothers as well as gangs of coolies performing heavy work. Where the diet is deficient in calcium salts and phosphates (as, for example, in Northern China and North-West India), it is chiefly the child-bearing women who suffer from osteomalacia, although the men are also affected if the

deficiency is very severe. Special need for protective food arises in cases of expectant and nursing mothers, who have to perform extra nutritive functions in addition to nourishing their own bodies. Growing children also require an abundance to provide nourishment for their growing tissues and the younger the child the greater the need for the protective foods. In these cases, there is special need for an adequate mineral and vitamin supply and for "good" protein. The results of deficiency may remain latent for some length of time in a manner analogous to the incubation period of an infective disease of low virulence, such as tuberculosis. Malnutrition, especially in children, affects, not only the physical health, but the mental development. It is a great evil at all ages, but there are specially sensitive periods when the organism is growing; such are found in uterine life, in early childhood and in adolescence, when the ill-effects of faulty nutrition are much more serious and may even be irreparable.

(a) *Expectant and Nursing Mothers.*

There is good reason to believe that a large amount of sickness and disability associated with child-bearing, and the high mortality rates of pregnant women, could be substantially reduced by improved feeding of these women. During pregnancy and lactation, the mother has not only to be supplied with all the nutritional factors necessary for her own health, but has also to sustain the extra burden of having to provide many essential chemical substances for the development of the growing embryo and foetus. It is undoubted that many modern diets are deficient in certain chemical substances and bring about much ill-health to the mother as well as defective development and diminished resistance of the foetus and infant. One of the commonest defects in modern civilised diets is a faulty mineral supply leading to disordered calcium metabolism, so that the mother has to sacrifice the calcium salts of her own bones for the developing offspring. This deficiency may be so great as to result in osteomalacia, but, whereas this is rare in European countries, smaller defects in calcium metabolism are undoubtedly common. This is evident in the increased tendency to dental caries in women at these times. Other distressing complaints

during pregnancy, which are apparently related to the defective calcium nutrition, include muscle soreness and weakness, and the consequent inability to perform ordinary daily activities, which is generally not relieved by rest during the day or on retiring at night; also, the inability to sit or lie long in one position, a condition often associated with intervals of more definite muscle spasm and contractions which may be quite severe. In an investigation made in America on 576 cases of pregnancy,¹ 316 complained of symptoms of this nature. In almost all these cases, relief followed the administration of additional calcium and vitamin D. It must be remembered that, between the twenty-eighth week of pregnancy and full term, the maternal organism has to supply to the foetus as much as 25 grammes of calcium and 15 grammes of phosphorus, amounts which ought to be provided by a sufficient intake of milk and other protective foods in her diet. Similarly, a nursing mother also provides as much as 0.4 gramme of calcium daily to her infant, which, over a period of months, causes a large drain on her own supplies unless she is receiving an abundant amount in her food. In a Norwegian investigation, eleven women out of sixteen were found in a condition of negative calcium balance towards the end of pregnancy—that is to say, these women were losing more calcium from their body than was provided in their food, and this negative balance could only be made positive by increasing the daily calcium intake to 1.6 gramme by providing them with about two pints of milk a day. Other sources of vitamin D, such as cod-liver oil or egg-yolk, also had a powerful effect in improving this condition.

Another substance which is likely to be deficient in the diet of pregnant women is iron, of which the maternal organism has to supply a relatively large quantity to the foetus. A large proportion of women of child-bearing age suffer from simple anæmia, and this condition is exaggerated by pregnancy and lactation. Thus, in an investigation made at a hospital in London, rather more than 50% of nursing mothers had a hæmoglobin content of the blood of less than 80%. This common deficiency can be repaired either by giving iron salts in pregnancy or,

¹ *Am. J. Obstet. & Gynecol.*

better still, by giving foodstuffs rich in iron, such as meat, egg-yolk and vegetables.

It is well known, also, that a deficiency of iodine in the diet of pregnant women may be of great significance. It is true that only small quantities of iodine are necessary to supply the demands of the offspring at this time, but this minimum is essential to prevent cretinism and goitre, and ordinary foodstuffs are so deficient in iodine that it is sometimes impossible to ensure even this small amount. In some countries in Central Europe, this difficulty is overcome by giving iodised salt in food—that is to say, sodium chloride containing 1 part of sodium iodide in 200,000 parts of sodium chloride. As regards natural foodstuffs, sea fish is the only rich source of iodine and, where procurable, this ought to be included in the diet of all pregnant women once or twice a week. Otherwise, it is essential to add iodised salt to the food.

There is evidence that vitamins are commonly deficient in the diet of pregnant women. The commonest deficiency is probably that of vitamin D; vitamins A and C are also ingested in deficient amount in many instances. These dietetic defects, except in the case of vitamin D, can be readily overcome by including such protective foods as milk, eggs, green and other vegetables and fruit in the diet. Where there is lack of sunshine, vitamin D can be provided in abundance in the form of cod-liver oil or of some preparation of the vitamin itself.

Although it is true that our knowledge of feeding in pregnancy and lactation is elementary, it can be said with some assurance that, in regard to the health of both mother and offspring, an increase in the protective foodstuffs would have a large effect in eliminating many of the ills of pregnancy.

(b) *Infants.*

The importance of breast-feeding. — Complete breast-feeding of infants is of very great importance. It is cheaper, simpler and cleaner than artificial feeding and, in the case of a properly fed mother, the benefits brought to the infant are great. Impressive evidence on this point was supplied by a large-scale enquiry reported from the Infant Welfare Centre of Chicago,

in which 20,061 infants attending the centre between the years 1924-1929 were closely followed up for the first nine months of each infant life. Of these, 48.5% were wholly breast-fed, 43% partially breast-fed, and 8.5% wholly artificially fed. The artificial feeding was carried out on a definite plan, and all the infants—artificially fed and otherwise—were attended at intervals by the officials of the centre. The mortality rates of these different groups of infants were as follows :

	Number of infants	Total deaths	Percentage of deaths of infants
Wholly breast-fed . . .	9,749	15	0.15
Partially	8,605	59	0.7
Artificially fed	1,707	144	8.4

It will be seen that the mortality rate among the artificially fed infants is fifty-six times greater than that among those completely breast-fed. The difference in the death-rate between these classes of infants was largely due to deaths following respiratory infections and, to a less degree, gastro-intestinal and other infections. Thus, whereas only four out of 9,749 of the breast-fed infants died of respiratory infections, eighty-two out of the 1,707 artificially fed infants died from this cause.

No clearer evidence could be obtained to enforce the advantages of breast-feeding as compared with artificial feeding. Similar impressive evidence on the value of breast-feeding was afforded by the enquiry of the League of Nations into the causes of infant mortality in six European countries and four South-American countries, which also demonstrated the part played by bad feeding in infant mortality. Where this mortality was low, the digestive troubles usually caused by defective feeding were rare ; where it was high, digestive troubles were very prevalent—they were the outstanding cause of death, and it is by reducing them that mortality can be reduced. Conversely, where breast-feeding was general, the “ nutritional peril ” was usually small ; where artificial feeding predominated, it was great. But, although the superiority of breast-feeding over artificial feeding with cow’s milk has been demonstrated,

breast-fed infants may yet be improperly nourished if, in addition to their mother's milk, they are given other untimely or unwholesome food, or do not receive the necessary vitamins in the form of supplementary foods.

The increased frequency of respiratory, gastro-intestinal and other infections in artificially fed infants and the resulting greater mortality can be ascribed to two causes. One is the " food peril " itself, which may be due to the infected milk of an artificial diet or to the irritating and indigestible nature of other constituents, and the other is the diminished degree of resistance to infection produced in infants fed on artificial diets as compared with those receiving mothers' milk.

Common nutritional defects of infants. — The necessity for proper feeding of the nursing mother in order to allow the maintenance of her own health, to ensure the presence in her milk of a good supply of all the essentials for the infant's health and development, and even for the continuation of an abundant milk secretion, has been mentioned above. In breast-feeding under good conditions, the need for giving supplementary dietetic substances to the infant is diminished. In most cases, however, it is advisable to include cod-liver oil to supply additional vitamins A and D and iodine, and some form of vitamin C, such as orange juice.

Infants at birth have an abundant supply of iron stored in their livers and, in the period of milk-feeding, these stores are gradually used up so that the hæmoglobin in the blood is reduced from 100% at birth to about 70% at the age of three months. This can be regarded as a physiological type of anæmia, as it occurs in practically all infants, both breast and artificially fed, although the fall is more severe and the recovery during subsequent months less in artificially fed than in breast-fed infants. The administration of iron to these infants will raise the hæmoglobin level to 77% and upwards in the period from 5 to 12 months of age. In untreated infants, the hæmoglobin will generally drop from 70% at 5 or 6 months of age to 65% at 12 months of age. It has also been shown that the infants with low hæmoglobin in their blood have a much higher sickness rate due to infections than those receiving iron. The need for including iron-containing foods, such as egg-yolk or

some form of iron itself, into the diet of infants over 6 months seems evident.

Even in the case of breast-fed infants, it may be desirable to give dietary supplements, but the need varies according to the climate. Thus, infants born in the tropics and exposed to much sunshine may need no extra vitamin D. Where infants are not so exposed it is of great importance that the diet should have a high calcifying value from birth onwards to ensure perfect calcification of the developing teeth and the proper growth of the jaws, preventing subsequent irregularities of the teeth. Such a diet will also prevent rickets and osteoporosis¹ and ensure the formation and growth of good bones.

In the case of the artificially fed infant, the inclusion of vitamin D and other specific protective substances is of much greater importance. Such infants ought always to be given cod-liver oil, orange juice, or some other product rich in vitamin C, also egg-yolk, because the common illnesses of infants, such as rickets, defective formation of teeth and anæmia, are much more frequently found in artificially fed than in breast-fed children, while gastric and respiratory infections in the former are much more likely to be severe and even fatal.

There is a common practice nowadays of including cereal and cereal products in the diet of young infants. The immediate effect of giving such foodstuffs is often apparently beneficial, as indicated by the increase in weight. The modern teaching of nutrition, however, is against giving cereals before 8 months or so, and even then only small amounts should be given. Many cereal products are very poor in vitamins and available mineral elements and their inclusion in the diet limits the intake of milk and other protective foods. There is also evidence that they actually are harmful in the sense that they increase the demand for vitamins A and D and calcium and that their own calcium and phosphorus content are not available for the formation of bone in the growing organism under some circumstances. Thus a rapidly growing infant nourished with cereals is more liable to suffer from defects of calcification of the bones and teeth than one on a diet of milk

¹ Osteoporosis is a condition of the bones in which the substance which gives them hardness—*i.e.*, calcium phosphate—diminishes. Such bones easily fracture.

and other protective foods only. It is probable also that the consumption of cereals by these young infants diminishes their resistance to broncho-pneumonia, intestinal and other infections.

The enquiry made by the League of Nations into the causes of infant mortality referred to above made it clear that the pernicious combination of poverty and ignorance was largely responsible for the malnutrition of infancy, as, indeed, for that seen in other stages of human life.

(c) *Early Childhood, Pre-school Age, Nursery-school Age.*

As a rule, maternal and infant welfare institutions do not yet follow the child beyond the end of its second year, and there is consequently a gap in the health supervision between infancy and school age. Yet that is the time when malformations of the bones, dental defects and abnormalities of the pharynx appear. They will be discovered by the school medical officer, but it will then be too late to prevent and, in some cases, to remedy them. It is desirable to prevent these causes of chronic ill-health as far as possible by procuring improved feeding of children in these early years, both by extending the application of social services and infant welfare institutions forwards, or of the school medical services backwards to this age, and by increasing the knowledge and means of poor parents for better feeding of their offspring.

By the time children enter school, at the age of 5, large numbers show some form of physical defect and, although there is no proof that all of these defects could have been avoided by improved feeding, there is good evidence that many would not have developed under such conditions. In a recent enquiry (1931) in London schools, it was revealed that, among children of 5 years of age, there were from 67% to 88% of cases of abnormalities of the bones, 67% to 82% (according to the gravity of the symptoms) of cases of adenoids, enlarged and septic tonsils, and other disorders of the pharynx, 88% to 93% having badly formed or decayed teeth. There is evidence that the defective bone formation and much of the dental decay among

these children would have been avoided by the inclusion in their diet of large quantities of the protective foods, such as dairy products, and therefore less reliance upon bread and other cereals. How serious and widespread may be the defects in the feeding of children at this age can be seen in the following example : in 1921, in a city in the United States, out of 6,015 children of pre-school age, 90% were found to be receiving an inadequate diet according to current standards, 57% never received any fresh milk, 16% no milk of any kind, 59.5% no eggs, 60% practically no fruit, 50% no vegetable other than potatoes. As an aggravating circumstance, these dietary deficiencies were accompanied by a lack of proper rest or sleep. Is it any wonder that so many of the children beginning school life show physical defects and mental inactivity ?

It is just at this age that there is great need to maintain the resistance of children at the highest possible level against the ravages of the infectious diseases to which they will be exposed, such as measles and scarlet fever, and especially their sequelæ, broncho-pneumonia, middle-ear disease and nephritis. These diseases, if they do not kill, often leave the child with some chronic disorder which disables it for life. It is, for instance, at this age that deafness often has its starting-point owing to infection of the ear following measles and scarlet fever. Below the age of 3 years, measles is a particularly deadly disease, and there is suggestive but not conclusive evidence that the high mortality rate at this and older ages could be reduced by better nutrition of such children.

(d) *School Age.*

In the early years of school life, many of the children are already "damaged goods". They frequently show evidence of previous defective feeding and lack of care in deformity of the bones of the limbs, chest and head, in bad dental structure often associated with decay, in deafness to a greater or less degree, in running ears, septic tonsils and adenoids, and in simple goitres. These indications of disease are not generally, however, from the present medical point of view, regarded as evidence of

malnutrition and, indeed, there is no definite proof that some of them—*e.g.*, running ears, enlarged and septic tonsils—would have been prevented by proper feeding from early life, although this is probable.

Malnutrition is usually diagnosed in school-children on the basis of subnormal growth and weight and general sickly appearance of the child. Nothing is more important than that a new attitude should be adopted towards this problem, for whereas such results of improper feeding as subnormal growth and weight and undefined general ill-health can usually be rapidly improved by better feeding conditions, the more chronic conditions due to earlier defective dieting cannot be so easily remedied, but continue to act as a handicap throughout life. The system of medical inspection of children that is now generally established under State control in different countries must be sadly handicapped so long as it has to deal with many children who come under its control from the beginning in a pathological state. Prevention rather than treatment of disease must be more and more emphatically stressed and, so far as this can be procured by better feeding, this ought to be done.

Even, however, on the present basis of diagnosis, there is abundant evidence of malnutrition in school-children. From 20 to 30% of school-children were found to be under-nourished in the poor quarters of Paris; in some cases, the only meal the children had during the day was that provided by the school canteen. Such cases are reported as frequent in Yugoslavia. In Poland, according to a recent estimate, 25% of school-children are ill-nourished in certain regions, 7% are threatened with tuberculosis, while additional meals should be given to at least 50% (according to documents received by the Mixed Committee). In the United States, 7½ million school-children were under-nourished in 1933, according to a statement by the Secretary of Agriculture.

In 1917, according to specialists in rickets, nearly all the children of the negro population of New York were suffering from this disease; 83% in Connecticut in 1923; 43.4% in the villages in the north of Norway in 1931; 33 to 67% in two northern counties of Sweden. Rickets is still an important

social disease in England, although the discovery of its ætiology and means of prevention is gradually causing its reduction. As regards dental caries, the enquiries carried out in various European countries have shown it to be present in from 50 to 95% of the children examined. In a recent enquiry undertaken in Norway, only 160 out of 25,000 school-children examined possessed perfect sets of teeth. According to the English report mentioned above, out of 3,303,983 children examined in 1933, 2,263,135 needed dental treatment.

It is true that all these observations have not been based on uniform tests and that the state of ill-health of children likewise depends on other causes : sequelæ of previous infectious diseases, faulty hygiene in the home and inadequate amount of sleep and exercise in the open air.

So far as greater height and weight, muscular strength, general vitality and more vigorous activity are concerned, there is definite proof that much can be done by improved feeding of school-children. The evidence is of two kinds : first, derived from observations in which diets of school-children in boarding-schools have been constant over a period of years and then changed over a further period of years ; and, secondly, from experiments in which milk or some other supplement has been added to the dietary over a period of months, and the effect of this change on the children noted. An example of the first of the experiments is seen in one English Public School, where the diet was closely controlled over the years 1913 to 1933. Between the periods 1919-20 and 1928-29, there was a substantial increase in milk consumption, butter was substituted for vegetable margarine and there was a decreased consumption of bread. Associated with these changes in the diet, the average height of boys of 11 years of age increased from 4ft. 6.65in. to 4ft. 7.33in. and that of boys of 15 years of age increased from 5ft. 2.89in. to 5ft. 3.97in. There was a correspondingly large increase in weight of these children during the period of improved feeding. Curiously, two other improvements in general condition, probably due to increased milk consumption, were observed which are of great significance — namely, (a) a great decrease in fractures of bones in accidents, and (b) a decrease in rheumatism and rheumatic conditions.

The effect of adding milk and other supplements to the diet for a period of one year was, according to an English writer, equally dramatic in its action. A pint of milk added daily to what was considered a good diet in an institutional boarding-school caused in boys of 6 to 11 years old an increase of 2.63 inches in height and of 6.98 lb. in weight as compared with increases of only 1.84 inches and 3.85 lb. by similar boys who did not receive the supplement of milk. It was also remarked that there was much less illness among the extra-milk children, especially naso-pharyngeal catarrh, a reduced tendency to chilblains, a better condition of the skin, while the children were more high-spirited and irrepressible, which may or may not be regarded as a good change, but at least indicates that their nervous system had shared with the rest of the body in the stimulating effect of the milk. Burnet and Aykroyd have given accounts of other similar experiments on adding milk to the diet of school-children, and it may be taken as completely proved that the addition of milk to the diet of school-children would greatly increase their average height, weight, strength, vitality and general health.

Since school-children do not develop rickets or bone deformities, but only carry the stigma of earlier attacks of this disease, it is often assumed that they do not require so much milk to supply calcium as in earlier years. There is an element of truth in this idea, but only an element. The bones and teeth of school-children are growing and calcifying rapidly, and defective calcification of bones makes itself obvious by the ease with which they break. The frequency of bone fracture is a great social problem in some countries, especially in industrial countries, and deserves more attention than it receives, and there is little doubt that this trouble would be greatly reduced by the consumption of larger quantities of milk and other protective foods.

Another important problem of child health is the tendency, during the school age, to contract acute rheumatism with its tragic associates, chorea, heart disease (rheumatic endocarditis), one of the commonest causes of chronic disability, ill-health and early death in some countries. If the greater consumption of protective foods can reduce these distressing conditions—

and there is some suggestive evidence that it can do so—a great blessing would be conferred on mankind.

Compulsory education has been generally adopted throughout the civilised world. It is agreed that large numbers of school-children are not mentally or physically capable of profiting by this universally accepted recognition of the social obligation to educate the mind of every individual. Might it not be as well to make such children more physically and mentally fitted to benefit fully from these educational facilities by assuring that their nutritional needs are fully satisfied ?

(e) *Adolescence.*

The state of nutrition among adolescents is much less accurately known than among school-children. All authorities on the subject are, however, agreed that, under normal conditions of life, this is one of the most crucial periods. The rapid rate of growth of the adolescent makes abundant and efficient nutrition particularly important and yet this is a period when the State ceases to show a maternal interest in his physical well-being. There is evidence that, even in the case of boys and girls entering good employment at the age of 14 or 15 with reasonably good physique, they suffer much deterioration by the age of 18, a condition which is largely due to insufficient and unsuitable food eaten during this period.

This is the age when the most serious cases of pulmonary tuberculosis occur. Every tuberculosis specialist is convinced that the appearance of tuberculosis before the twentieth year is due to two main causes : overwork and malnutrition.

Although the general incidence of tuberculosis has been decreasing in many countries gradually during the past 100 years, and especially during the past thirty years, it is a distressing fact that this rate of reduction does not occur to the same extent in the case of adolescent and young adult people. Indeed, in young women there has been an increase in tuberculosis during recent years in some countries. This state of affairs has been ascribed by some to the modern habit of "slimming", by others to the greater expenditure dictated by

modern habits of life on clothes, which leaves too little money for the purchase of proper food. Whatever may be the real explanation, it is undoubted that many adolescents in all countries, but particularly in industrial countries, are being improperly nourished at the present time and are suffering in consequence. Efforts of an educative nature ought to be taken to make adolescent boys and girls realise that the best health and the fullest physical and mental development is only possible if their dietary contains an abundance of the protective foodstuffs.

(f) *Young Soldiers.*

Military service claims young men at the end of adolescence, before they are fully mature. The rejection as unfit of a proportion of the men called up is not evidence that malnutrition is the only cause of their rejection, but military doctors do, in fact, assert, on their knowledge of the facts, that malnutrition is one of the main causes. In Belgium, as a result of the examination of 49,000 recruits in 1931, it was found that physical fitness had declined as compared with pre-war statistics, and among the causes (increase in school work, unemployment, excessive championship-hunting in sports), the defective feeding of children during the war and the increase in the incidence of diseases of the digestive tract are ranked first. In Denmark, a third of the recruits present a combination of symptoms known as "Danish disease" (flat feet, varicose veins, pains in the extremities and cramp in the calf of the leg). In Finland, notwithstanding the very high level of athletic attainments, 21% of recruits are rejected, and doctors attribute this to general malnutrition among the poorer classes. In Poland, where there is a mass of evidence to show the vast extent of malnutrition, the proportion of recruits rejected amounts to 50%. It is a pity that the examination of recruits is not made more use of as a means of enquiry into malnutrition. How can we help being alarmed when we learn that, in the army of a large European nation, the proportion of men rejected for physical unfitness has risen, between 1923 and 1932, from 45.25 to 67.78 per thousand?

(g) *Adults.*

Every fresh enquiry, in town or country, reveals either patent or latent malnutrition.¹

The recent history of the high incidence of malnutrition among adults seems to be identified with that of unemployment. If unemployment has not augmented the evil of malnutrition to the extent that might have been expected, it is because malnutrition has been held in check by the development of Public Health Services. The effect of unemployment relief is reflected in an improvement in the diet of the unemployed. On the one hand, expenditure of energy and food requirements were diminished, and, on the other, when large-scale social organisations take care of the unemployed, the latter's diet, though less abundant, is often more rational.

It would be a mistake to believe that, generally speaking, unemployment produces no harmful effects. Its effects are to be sought, not so much among the adult unemployed as among their growing children. For more than two years now, in the United States of America, the Children's Bureau has been collecting information of different kinds from various sources which proves that the depression is having an increasingly bad effect on the nutrition and health of children. Thus, according to the New York City records, the percentage of school-children in a bad state of nutrition rose between 1929 and 1932 from 16 to 29 in Manhattan and from 13 to 23 in the Bronx. At Philadelphia, among young children under 6 years of age examined at the "Community Health Center", the figure rose from 11 (1928-1930) to 24 (in 1932).

The ravages caused by rickets, the most serious deficiency disease in countries of the temperate zone, have been described above in the section on children. It is in adult women, however,

¹ In the United States of America, according to a recent communication from the Cost-of-living Division in the Ministry of Labor, of 209 families examined in the North-Atlantic States, 14% were found to be under-nourished "from every point of view". In Yugoslavia, the so-called "passive" regions, which produce neither wheat nor other vegetable foodstuffs, are suffering to a great extent from malnutrition owing to the exiguity of their purchasing power. Among certain classes of workers, wages are not sufficient to provide an adequate dietary, particularly when there are not enough wage-earning members of the family. In certain districts in Northern Sweden, where agricultural production is scanty and foodstuffs are scarce, a deficiency of vitamins has been observed. Cases of anæmia and scurvy are not infrequent.

that one of the most serious disabilities of rickets becomes manifest, although the cause of the trouble has really started in the young and adolescent stages of life. The condition referred to is contracted or rickety pelvis, a defect frequently found in women in industrial centres. The small size and deformed shape of the pelvis in such women prevents the easy birth of the infant. A greater call on surgical interference is therefore made in child-birth under such circumstances, and this not only means greater distress to the mother, but also an increase in the liability of these women to puerperal fever, one of the commonest causes of death after child-birth. This is one of the best examples that can be given of the importance of prevention when dealing with a common and widespread disorder. The problem of the large number of deaths associated with child-birth is rousing much interest in some countries. Surely an essential point in any attempt to diminish this serious state of affairs is first to ensure fully developed and perfectly formed pelvis bones in child-bearing women by proper feeding of female children and adolescents. If this were attained, surgical help in child-birth would be much less needed and there would undoubtedly be a diminution in maternal mortality.

Another deficiency disease, pellagra, still plays havoc in temperate countries and causes 3,000 deaths a year in Roumania and 4,000 in the United States of America. If complete data were available, deficiency diseases, whether patent or latent, and their sequelæ, would probably be found to occupy a far more important place in the annals of malnutrition than at present appears. Certain diseases which were thought to have been stamped out or to have become very rare are again making their appearance. In connection with the privations caused by the war, Danish doctors noted a sort of recrudescence of diseases of the eye caused by nutritional deficiencies, including a deficiency in vitamin A : thickening and opacification of the cornea, and weak vision, particularly at dawn and dusk. These symptoms would be detected more frequently if they were looked for more often.

There is considerable evidence of the influence of defective feeding on the tuberculosis death rate. The figures must be treated with caution, because in most cases other physical and

mental causes are present, such as overcrowding, slums, overwork and worry. But no doctor who has had any experience of tuberculosis will deny the influence of diet upon the outset, progress and also the prevention and cure of this disease. Moreover, there have been, in the recent history of Europe, during and after the war, certain sad exceptional periods distinguished—unenviably—by food restrictions with which have coincided a very marked recrudescence of tuberculosis mortality: in the United Kingdom as from 1915, in the Netherlands as from 1916 and in French Flanders during the enemy occupation; in Germany, during the war and during the inflation period of 1922-23. A few months after the cessation of the restrictions or blockade, the death rate fell to its pre-war figure. Generally speaking, it had been higher in the towns than in the country, because the country population could grow their own food and thus were not affected by some of the restrictions. In Denmark, the tuberculosis death rate, which had been steadily falling before the war, increased a little during the war as a result of food restrictions, although at that time there was no housing shortage. Subsequently, after the war, the tuberculosis death rate resumed its downward trend in spite of a prolonged housing shortage; circumstances had dissociated two of the causes of tuberculosis mortality—housing and nutrition—and had demonstrated the outstanding importance of the latter.

Tuberculosis in industrial centres, although diminishing in incidence, is still one of the great killing diseases. It must also be remembered that, although this disease is being gradually reduced, the rate of reduction is much smaller in adults than it is in children. In fact, in dealing with adolescents, it was pointed out above that the incidence of tuberculosis in young women (15-25) and to a less extent in young men has actually increased in some years during the past decade. Apart, however, from adolescence, the death rate due to tuberculosis in the adult is still very high, and it may be hoped that a wider adoption of the teachings of the present report by adults will bring about a substantial decrease in incidence, together with a corresponding fall in the death rate. Bronchitis, like tuberculosis, is a more deadly disease among poor people than among the well-to-do, in contrast to the greater frequency with which diabetes mellitus

and appendicitis occurs among those with more money to spend. The position as regards the question of some relationship between bronchitis in the adult and malnourishment is similar to that of tuberculosis—that is to say, there is only suggestive, but not established, evidence of a direct correlation. Here again, therefore, it is possible that an increase in the consumption of protective foods, especially by poor people, would reduce the incidence and death rate due to this disease.

Though further enquiries will be necessary to establish the influence of certain given foodstuffs on human susceptibility or resistance to infection, there can be no doubt as to the general value of a proper diet in increasing resistance to disease.

5. THE MODERN SCIENCE OF NUTRITION AND THE LONDON REPORT.¹

The New Science of Nutrition.

In determining human dietary standards, physiologists in the past have generally devoted their attention to minimum requirements. Such was the usual standpoint of Governments and administrations when called upon to fix the rations for bodies of workers, or to feed large masses of soldiers and civilians in war, or when obliged to assist the unemployed and their families during the time of industrial depression.

The idea of an *optimum* diet, on the other hand, has been developed and brought into pre-eminence by modern science. An optimum diet is one which provides for the full development of the individual for efficiency without exhaustion and for his resistance to disease.

The standard for adequate nutrition, like the standard for hygiene in general, cannot be limited to that required for the prevention of avoidable diseases by means of a minimum or barely adequate diet; the business of adequate nutrition is to create health by means of the optimum diet.

Many of the well-recognised vitamin-deficiency diseases—such as scurvy, rickets, beri-beri, pellagra—are caused by severe,

¹ The London Report on "The Physiological Bases of Nutrition" by the Technical Commission of the Health Committee in November 1935. It has since been revised and amplified and in this form is reproduced as Volume II of the present report (see Introduction).

prolonged deficiency of one or other of the essential protective vitamins. Except for rickets, they are, fortunately, of relatively rare occurrence in temperate regions, and their full manifestation can usually be prevented by a minimal intake of the appropriate preventive factors. Much more common are the latent states of malnutrition, which may give rise to no visible disease—states which might be called pre-rickets and pre-osteoporosis, pre-pellagra, pre-beri-beri, pre-caries or the formation of teeth of imperfect architecture. The opportunity that lies before the science of preventive nutritional medicine rests upon the knowledge that these states exist and upon the proof of the necessity for striving after *optimum* nutrition rather than *minimum* nutrition.

In this connection, it has been observed that nutritional research will exercise a greater influence in preventive medicine by increasing the vitality of the human species, with all that that implies, than by preventing the frank "deficiency diseases". The importance of this fact has not yet been fully recognised. The health of the individual, in the majority of cases, is destroyed, not so often by severe attacks of illness (which are more in the nature of accidents), as by the gradual action of persistent but unrecognised causes, of which one of the most important is a badly composed dietary. This is one cause of inferior physical development and nervous instability, of lack of recuperative power and endurance, and consequently of cumulative fatigue and lack of resistance to tuberculosis and other infections. Moreover, the diet largely influences the rate at which the organism ages and consequently the duration of life.

Preventive action against such nutritional diseases as scurvy, rickets and beri-beri, although superficially more impressive, is probably of less importance to the human race than the acquisition and application of such knowledge as will also improve the general condition and well-being of every man, woman and child, through the better choice, provision and utilisation of foodstuffs.

Such are the principles underlying the work of the Commission of Physiologists appointed by the Health Committee which held its first session in London at the end of November 1935.

6. DIETARY STANDARDS ADOPTED IN THE LONDON REPORT.

The Assembly resolution of 1935 recommended that the technical organisations of the League should make a study of nutrition in its relation to public health, labour, agriculture, trade and social progress. The basis of this work being the science of nutrition, it was necessary to obtain a pronouncement from nutritional experts as to the nutritional needs of the human being in the course of its development, from conception to the adult age. This pronouncement is contained in the report of the London Commission.

The question of human nutritional requirements has been under the close consideration of physiologists during the last three-quarters of a century, their conclusions being based either : (1) on the average spontaneous consumption of population groups ; (2) on statistics of food production and food imports and exports for a nation or a city ; or (3) on direct experiment with calorimetry on animals and human beings. The answers given by the scientists are matters of importance for public health, labour, agriculture, trade and public and private finance, and have been both numerous and varied. This circumstance has been a matter of amusement at times to the layman, but a source of anxiety and difficulty to the medical men and administrators who have to prescribe for individuals and to feed communities and masses of the population. Opinions regarding the necessary number of calories follow two tendencies : one towards the maximum and the other towards the minimum requirements.

In the London report, the two aspects of nutrition, the quantitative and qualitative, described in the Introduction to this memorandum, and the fundamental importance of protective foods, are brought out by the division of the report into two parts : I—dealing with energy, protein, and fat requirements ; II—dealing with mineral and vitamin requirements. In both parts, the dominant idea is the needs of the human being during development. At the beginning of life, the child is inseparable from the mother, and additions, not only of energy, but also of protein and of all protective

elements, are prescribed for pregnant women, nursing mothers, infants, children and adolescents.

(a) *Energy Requirements.*

The human race is not made up of arithmetical units, but of adults, adolescents and children of both sexes ; of childless women, pregnant women and nursing mothers ; of workers both manual and sedentary, and of idlers. If the ration for an adult male (and, even so, what type of male adult is meant ?) is taken as unity, what is the proper fraction for a woman, or for a child at different ages, or for an adolescent at different stages of growth ? In other words, what coefficient is to be used for conversion of the standard to the appropriate figures for each class ? There are in existence a score of scales of coefficients among which physiologists and hygienists can choose. The need is now felt, however, for a common scale which will allow of uniformity in national and international comparisons. The question was considered by the Rome Conference of Experts (1932), but only a provisional solution was reached. The questions of the standard calorie ration for the male adult and of the scale of coefficients were therefore dealt with at the London meeting.

Instead of adopting a mean figure representing the needs of an adult man performing an average but indeterminate output of work, the Commission fixed a basic figure representing the requirement for maintenance to which supplements are to be added for work, growth, pregnancy and lactation. This basic figure represents the need of the average adult, male or female, living an ordinary everyday life in a temperate climate and not engaged in manual work. The needs of such an adult are stated to be met by 2,400 calories *net* (*i.e.*, after deducting waste in cooking and at table) per day. Most authorities have agreed upon this figure for the type of adult, under consideration ; and it so happens that the figure is convenient for calculation on a basis of 100 calories per hour. Conditions and age being equal, no difference is made between the sexes.

As the amount of muscular effort varies with the occupation and the number of hours of work, it is convenient to calculate the supplements on an hourly basis. Four grades of work are distinguished—light, moderate, hard and very hard—within which it will be possible for hygienists and engineers to place any given form of work.

(b) *Protective Foods, Mineral and Vitamin Requirements.*

In Part II of the London report, stress is laid on the need for protective foods. These are expressed in everyday terms as milk, butter, cheese, eggs, meat, potatoes, fresh green vegetables and fresh fruit. Sunlight is also reckoned as a protective nutritional agent, because it generates vitamin D in the organism.

Milk.

The need for milk in the human dietary. — The use of the milk of cows and other mammals in the diet of the human race is as old as the history of mankind, and during the long ages in which it has been thus used its value has ever been highly esteemed. A land “flowing with milk” was the ideal of pastoral tribes in ancient times and will still remain the ideal, if the correct nutrition and health of the people receive due consideration.

The value of milk is well demonstrated by a survey of the dietary habits of the different native races inhabiting the world. Fine physique, good health and virility are usually seen in races where milk has an important place in the diet, as, for example, amongst the Arabs and other races inhabiting South-Western Asia and South-Eastern Europe. The contrast in health, strength and stamina is proverbial between the Hill tribes of India, who partake largely of milk, and those dwelling in the plains, where the diet is more exclusively vegetarian and consists largely of cereals.

Modern scientific research has entirely confirmed the empirical conclusions drawn from human experience as to the dietary value of milk. Milk, which is designed to afford complete nutrition to the mammalian young, is known to contain all

the factors needed for satisfactory nutrition, combined in a suitably proportioned mixture of :

- (1) Protein of good quality,
- (2) Fat,
- (3) Carbohydrate,
- (4) Mineral salts,
- (5) Vitamins.

In this respect, *milk is the nearest approach we possess to a perfect and complete food, and no other single food is known that can be used as a substitute.* If this had not been so, milk would long ago have disappeared from the dietary of civilised peoples, especially of those dwelling in cities. For milk is not only the most *nutritious*, but is also the most *inconvenient*, and at times may be a *dangerous* foodstuff. For its high nutritive value makes it also a perfect medium for the growth of other organisms, including bacteria. In other words, milk will not “ keep ”, and an elaborate organisation is needed to bring it regularly to the consumer in a fresh condition. Apart from the bacteria concerned with the “ natural ” processes of souring and putrefaction, milk may also act as a vehicle for the spread of the germs of definite disease, such as tuberculosis, diphtheria, typhoid and scarlet fevers. The reason why, in spite of these drawbacks, we continue to include milk in our diet is because *its value is unique and we cannot do without it.*

The nutritive value of milk. — (i) The *proteins* contained in milk, lactalbumin and casein, possess a high nutritive value, since the amino-acids of which they are composed make them especially suited to supply the requirements of growth in the young, as well as of maintenance in the adult.

(ii) *The carbohydrate* is present in milk in a soluble form, as milk-sugar.

(iii) *The fats* of milk are present in an emulsion of different fats of low melting-point. Milk-fat, when separated as butter, is the most digestible and acceptable fat known to us and is a source of the vitamins A and D.

(iv) *Minerals*: cow's milk is one of the foods richest in salts, especially in calcium salts and phosphates. These two *minerals* are essential constituents of every cell in the body, so that an adequate supply is necessary for the maintenance of health at all ages. An abundant provision is specially necessary for the growing child, to support the growth of the bony tissues and teeth. The amount of lime in cow's milk (1.5—2 parts per 1,000) is only equalled by that contained in some green vegetables. In milk, however, the lime salts are present in a form specially easy of absorption.

(v) *Vitamins*: while the nutritive value of cow's milk depends to some extent on the diet and management of the cow, yet the nature and proportion of the protein, carbohydrate, fat and salts it contains are maintained with remarkable constancy over a wide range of variation in the type of feeding adopted. There is, however, more variation in the vitamin content, and the highest value in this respect is only found in the milk of cows which are exposed to the rays of the sun and fed on their natural diet of fresh green herbage—*i.e.*, on pasture in the summer; nevertheless, winter milk remains a valuable foodstuff in this respect. It is true that the amount of the antirachitic vitamin D, so essential for the growing child, is much reduced in winter milk.

Vitamin D, however, whose physiological function is to secure the retention in the body of the lime salts and phosphates ingested in the food, acts with much greater economy when these salts are present in abundance in the diet. In many climates in the winter, therefore, when, owing to the lack of sunshine, the growing child is unable to synthesise vitamin D for itself, an abundant supply of milk is specially needed, for the salts thus supplied will enhance the action of the diminished amount of vitamin D present in the milk and other articles of food.

The composition of the proteins of milk makes them specially adapted for the support of growth in young organisms and gives them a definite supplementary action towards those of cereals, which are inferior in nutritive value. Milk, it is recommended, should represent a large proportion of the diet at every age. The London report approved the tendency displayed in certain

countries to increase the consumption of milk to as much as one litre per day for pregnant women and nursing mothers, and to provide a comparatively large quantity for infants, children and adolescents. For these classes, it strongly recommends free or cheap milk distribution. It calls attention to the nutritive value of *skim milk*, which, although it has lost its fat and fat-soluble vitamins, retains many other valuable nutrients. It therefore deplors the way in which this valuable food is wasted in many countries. Of other milk products, *cheese* retains the proteins of milk, a large proportion of the calcium salts and vitamins, while *butter* is the most digestible and generally nutritious fat in the modern dietary.

Eggs.

Eggs are important as a source of good protein and of valuable minerals, including iron; the fat contained in the yolk is a rich source of most vitamins, especially of the B vitamins, also of the antirachitic vitamin D, which is otherwise sparsely distributed in foodstuffs.

Meat.

Meat has a special value as a source of protein and iron. Its popularity is chiefly due to its appetising and stimulating properties; but, from the nutritional point of view, the protein of ordinary muscle meat is inferior to that of eggs or milk. The glandular tissues, on the other hand—liver, kidney, sweetbread (pancreas)—are among the most highly nutritious foods we possess, as regards the character of the protein, the mineral and vitamin content. They are also rich in a substance which stimulates the formation of red blood-cells in the bone marrow.

Green and Leafy Vegetables.

Green leafy vegetables are rich in the B vitamins and in vitamin A; they are also among the richest sources of the antiscorbutic vitamin C. Since this vitamin is sensitive to heat, the dietary value of uncooked salads is obvious.

The abundance of minerals and vitamins in green vegetables and the special character of the protein, although present in

small quantities, make them of great value, especially as supplementary foods to a diet containing cereals. Just as among pastoral communities the defects of a cereal diet may be corrected with milk and dairy products, so, under other circumstances, correction can be obtained by green vegetables. In the densely populated regions of Southern China, for example, where animal foods cannot be raised, the deficiencies of the rice diet are largely repaired by the abundance of vegetables eaten.

Fruit.

The special nutritive value of fruit depends on high vitamin C (ascorbic acid) content. Different fruits vary greatly in their vitamin C content, the richest being citrus fruits (*e.g.*, oranges and lemons). Tomatoes are also valuable : grapes are relatively poor.

The total absence of vitamin C from the diet results in scurvy. In this serious condition, hæmorrhages may occur in all parts of the body, often accompanied by intense pain ; the gums are swollen and the teeth loosened. With infants and children, serious lesions occur in the bony tissues. Florid scurvy is developed under conditions of severe dietetic restriction ; but there is evidence that a less severe deficiency may lead to a departure from good health, the cause of which is not easily diagnosed.

Vitamin C is readily destroyed by heat, so that fruit jams and preserves usually contain none. It is probable that preserved fruits, however, may possess a dietary value due to their mineral content. Oranges, again, are rich in calcium salts, while grapes are rich in iron, and fruits generally may have a special value in supplying mineral constituents to those on otherwise restricted diets. Fruits having a yellow colour—*e.g.*, oranges and tomatoes—are often useful sources of vitamin A owing to their carotene content.

Cod-liver Oil.

The importance of cod-liver oil was stressed in the London report as a source of vitamin D for infants and growing children, especially for those living under climatic, seasonal and social

conditions where sunshine is limited. It is also a valuable source of iodine and vitamin A.

(c) *Energy-bearing Foods.*

The London report sets out some specimen diets for various age-groups up to the age of 5 years and for mothers. In these, the report so arranged the protective foods as to yield approximately 1,400 calories per head without the inclusion of any cereals, fats or sugar. These would have to be added as required to satisfy the energy requirements of any individual, as distinct from his essential mineral and vitamin requirements.

In their general recommendations, the experts, in the London report, emphasised the following views :

“ Although a simplified diet may be so constituted from a few protective foods as to be satisfactory, it is a general principle that variety in diet tends to safety, provided it contains a sufficiency of the protective types of food materials.”

“ White flour in the process of milling is deprived of important nutritive elements. Its use should be decreased and partial substitution by lightly milled cereals, and especially by potatoes, is recommended. The consumption of an excessive amount of sugar is to be condemned, and in this case also partial replacement by potatoes is urged.”

It will be noted that the London report recommends the modification in many countries of the proportions hitherto occupied in dietaries by the three foods named.

Cereals.

Cereals form a most convenient and acceptable food of high energy value and for centuries they have been the staple food of the great Asiatic and Mediterranean civilisations. Their value is self-evident ; but, in Europe especially, partly because of the increased availability of protective foods, their consumption has tended to diminish, except under conditions of heavy manual labour or because of limitations in income. At the same time, cereals are being consumed more and more

widely in a highly milled form. The report suggests that bread should be made more protective by restoring to the flour, as far as possible, the special nutritive principles contained in the husk and germ of the grain, particularly the vitamin B group. This recommendation, issued at a moment when the question of different kinds of bread is being discussed in every European country, is of great importance both for economic as well as for hygienic reasons.

Sugar.

In the last thirty years, sugar has become one of the cheapest forms of calories and the consumption has increased manifold in many European countries, especially among the poorer sections of the populations. In the United Kingdom, it has been estimated that a fivefold increase in average consumption has taken place during the last hundred years. Refined sugar, like highly milled cereal products, provides energy without any protective elements. An excessive proportion of sugar in the diet is especially bad for children, whose instinct to eat it seems altogether out of proportion to its nutritional qualities, since it occupies the place which should be filled by protective foods. It also spoils the appetite for the latter, which are even more necessary during the period of growth than in adult life.

Potatoes.

Special attention is called to the value of the potato as a food rich in calories and in starch and is particularly suited to substitute sugar and cereals in the modern European diet. The introduction of sugar and white flour to populations in remote districts has been followed by the occurrence of dental disease previously unknown. Examples are found among the inhabitants of Iceland, among Esquimo and native Indian tribes in Alaska and Western Canada and among the races inhabiting Northern Scandinavia. A large proportion of potatoes in the diet encourages no such predisposition to dental disease as is the case with cereals; populations showing relative freedom from dental disease with high consumption of potatoes are found in certain islands of the Hebrides, in rural Finland and in Poland, and in Tristan da Cunha, in which island at the present time

potatoes form a large proportion of the dietary, and dental caries is a rarity. Potatoes are also a valuable source of iron and vitamin C, and one of particular value, because they retain a high proportion of their vitamin C content after cooking.

7. PROBLEMS RECOMMENDED FOR FURTHER STUDY.

The London report is no more than the physiological basis of the concerted work conducted by the technical organisations of the League of Nations. It requires to be amplified by a series of practical investigations into nutrition in its relation to public health.

Among the problems earmarked in the report, some represent an extension of the questions that could not be fully discussed at the first session : minimum vitamin, mineral and fat requirements ; nutritive value of the various proteins, of various cereals according to the degree of milling, and sugar. The other questions form an integral part of the subject-matter of the London proceedings—namely, the nutritive requirements of the human being from conception up to adult age. They cannot be separated from it. The economist and the agriculturist have been provided with the needful data, but the application of the London report to nutritional hygiene is not possible without a study of these supplementary problems.

1. *Nutritive food requirements during the first year of life (or infancy).*
2. *The extent to which diets in common use fall below the standards recommended in this report.*

This involves the comparison of requirements as defined in the London report with resources available to mankind for their satisfaction.

3. *Assessment of nutritional state, especially that of children.*

These are the lines upon which the London report should be further expanded. Such a plan of work must necessarily be carried out internationally. The principles laid down in the report will be applied in different countries and will need

adaptation to a variety of populations, conditions, resources and forms of social life. Leaving aside the question of institutions and economic conditions, the rations as defined in the report will, for practical purposes, have to be expressed in terms of the foodstuffs which are customary in each country. The Commission which met in London accordingly decided that its report would be communicated for study to representative scientific institutions of various countries, which would, in turn, seek the advice of specialists interested in the various aspects of nutrition : internal medicine, pediatrics, school hygiene, preventive medicine, etc. It has thus organised an extensive scientific consultation on the bases laid down in the report and on the problems which it has recommended for further study.

The institutions consulted are of three kinds :

(1) National academies, academies of medicine and academies of science—this applies to Belgium, France, the Netherlands and Spain ;

(2) National scientific research councils—this applies to the United Kingdom, the United States of America and the Union of Soviet Socialist Republics ;

(3) National nutrition-commissions, already in existence and prepared to undertake this co-operation (Denmark, Italy) or specially set up for the purpose (Norway, Sweden). These commissions consist of physiologists, clinicians and hygienists.

Exchanges of views between the League of Nations Health Organisation and these institutions have led to an extension of the programme of work referred to them.

Among the specifically scientific questions recommended for study in the London report, it is natural that each institution should select those which are of immediate interest to it, because they correspond to health and social requirements or because they are being specially studied by certain scientists.

The problems which are noted as the most important and most urgent are nutritive food requirements in infancy, tests for the assessment of the state of nutrition, and the comparison

of requirements with available resources. On this last point, it does not seem probable that any findings can be arrived at in the near future, since this is a question which requires a staff trained in the conduct of social enquiries, time and money. So far as concerns the other two, however, which constitute the plan of immediate work, the Health Organisation will arrange for international technical consultations by commissions of experts.

These consultations will, in addition, cover a number of questions which, although not expressly mentioned in the appended list of the London report, have been implicitly raised by the proceedings of the Commission and the text of its report, among them the problem of milk.

Concerted international action would greatly stimulate the development of rational nutrition. An enormous mass of information on nutrition is available in the world, but it is fragmentary, heterogeneous and frequently devoid of scientific basis. As will be seen, many institutions have been created to improve nutrition, but some are working by empirical methods and have not yet been brought into line with the modern science of nutrition. So far, it is very difficult for the hygienist to ascertain the real state of nutrition. It is from a comparison of requirements and resources that the most instructive knowledge will be derived. Laboratory research and statistics are essential, but enquiries among particular groups of the population are still more so. If any slogan were required for use at the present time, it could only be this : " Enquiries and still more enquiries ".

8. PRINCIPLES OF GOVERNMENT ACTION.

Nutrition has become an essential part of public health work. Gradually, under pressure of circumstances, Governments have adopted measures of protection and assistance in regard to food supply.

It is now recognised that care for popular nutrition is a task no less essential for the public health services than, for instance, the campaign against tuberculosis.

From an examination of existing institutions and the large volume of information communicated to the Mixed Committee, it is already possible to discern the general direction of effort in the field of nutrition for the purpose of safeguarding and improving public health.

The natural rôle of the State is to be responsible for legislation and general direction and control; the local authorities are principally responsible for executive action; and private initiative in general for the various activities which may be classed as social service. Just as there are supreme National Defence Councils and National Economic Councils, so there should also be a National Food Council. This Council would study food problems and their influence on social life.

There is no civilised country without its food legislation, its food inspectors, and its laboratories for analysing foodstuffs. The object in view was for a long time mainly to enforce fair trading (prevention of adulteration), but has come more and more to be the protection of health by the verification of nutritive values according to recent scientific discoveries. Staple and widely consumed foodstuffs—bread, milk and tinned foods—are already subject to special health regulations. Pharmacological preparations of vitamins should be officially assayed and passed. The regulations for the proper preservation of foodstuffs might well be collected in a "Food Code".

The Government should be kept informed of the position as regards production and consumption by its general and special statistical services. To ascertain and compare the food requirements, the food resources and the state of health of the people considered in relation to their actual food intake, it must depend upon enquiries into population groups and their family budgets. These enquiries should form the basis of the country's food policy, just as in some countries they are the basis for the fixing of wages. They should be carried on constantly, so as to provide "nutrition indices" continually reflecting changing conditions.

Apart from the direct action taken in health institutions (health centres, milk dispensaries, consultation and other clinics, holiday camps, etc.), the State should encourage, direct, legislate for, and superintend the application of scientific methods

of proved efficacy. For motherhood, there is need for an additional supply of protective foodstuffs, especially milk, for pregnant women. For infants, the lessons of the new science of nutrition should be applied both to breast feeding and to artificial feeding. When necessary, milk, and school meals—which should include protective foodstuffs, especially milk—should be provided for children of pre-school and school age in order to prevent irreparable malformation and physical deficiency. For other classes of the community who may need it, assistance should be given partly in the form of food.

Chapter III.

NUTRITION AND LABOUR.

Survey of the Nutrition Problem by the International Labour Office.

In its report issued in June 1936, entitled "Workers' Nutrition and Social Policy", the International Labour Office surveyed the problem of adequate nutrition for workers in considerable detail. It is therefore unnecessary to consider the problem at length here. All that will be presented here is a brief summary of some of the most significant findings of the report of the International Labour Office.

The report begins with a consideration of the physiological relationships between food consumed and work performed. The attempt is made to evaluate various dietary standards that have been put forward for the benefit of workers engaged in particular types of work. The conclusion is reached that this field of enquiry is still in an undeveloped state and that a considerable amount of exploration and study remain to be done before definitive results can be formulated.

The International Labour Office report then goes on to survey the "facts on workers' diets". This part of the report is based on family budget enquiries and on statistics of national consumption of certain foodstuffs. The consumption of the main classes of food by workers' families in different countries at different income levels is examined; the nutrition problems of special workers' groups—such as agricultural workers, native labour, and unemployed workers during the recent depression—are briefly surveyed. Although it is recognised that the statistical data are insufficient for arriving at definite conclusions, a number of broad generalisations (discussed below in some detail) are stated.

In two succeeding chapters, the report considers the productive capacity of agriculture to meet the requirements of an adequate diet and sketches the social and economic aspects of the problem. The general conclusions reached are, first, that the actual and

potential productive capacity of agriculture is sufficient to assure a higher level of diet for the workers ; and, second, that the fundamental question involved is that of raising the purchasing power of the working population. It is pointed out that much of the workers' expenditure, other than for food, is usually of a type that cannot be lowered or postponed. Though the available evidence shows that, as the workers' purchasing power increases, their food purchases provide diets of increasing nutritive value, there is keen competition for the workers' earnings between food expenditures and other budgetary expenditures, such as housing, customary pleasures or cultural activities. Consequently, improvement of nutrition standards is closely related to the improvement of living standards generally.

After this general survey, the report devotes two chapters to social legislation in its bearing upon dietary standards and to existing agencies for improving popular nutrition. In the latter chapter, the organisation and activities of public, semi-public and private agencies dealing with nutrition are briefly described.

For the present purpose, two questions will be treated here : first, What light do family budget enquiries throw upon the dietaries of workers in different countries and at different levels of the income scale ? Secondly, What approaches have been made by social and labour legislation towards improving the nutrition of workers ?

I. WORKERS' DIETS AND UNDER-NOURISHMENT.

Statements concerning the dietaries of workers in different countries and at different income levels cannot but be provisional and approximate at best. Such statements are based largely on family budget enquiries, whose statistical and other limitations are carefully considered in the International Labour Office report. Regardless of these limitations, the data do permit some broad generalisations which are summarised below.

National Differences in Workers' Diets.

The first important conclusion which emerges from an analysis of family budget enquiries is that the dietaries obtaining among

workers in different countries are in definite relation to national standards of living. In countries where the general standard of consumption may be assumed to be relatively high, workers' dietaries tend to approach closer to approved nutritional standards than in countries where the general standard of consumption may be assumed to be relatively low. More specifically, the consumption of bread and cereals by workers, with due allowance for national tastes and habits, tends on the whole to be higher in industrially less advanced countries and to be lower in the more advanced countries ; meat and fish, on the one hand, and milk, milk products and eggs, on the other, show an opposite tendency ; fats and margarine manifest no clear trend ; the same applies to fruits and vegetables in general.

Workers' Diets at Different Income Levels.

The data available for the various countries studied show that daily calorie consumption tends to increase as workers advance along the income scale. It is significant that the calorie consumption at the lowest income levels in a number of countries falls below the London standard of 2,400 calories (net) daily. Thus, the budgetary enquiries among Polish workers indicate a rise from 2,200 calories in the lowest income group to 3,140 calories in the highest. Preliminary figures from a small sample taken from the large study now under way in the United States of America show that workers in the lower income groups obtain only 2,130 calories daily. The calorie intake for German workers ranges from 2,530 to 3,190 ; for Swedish workers, the variations take place on a higher level, from 3,120 to 3,480 calories.

Although the materials available for analysis are meagre, they seem to point towards the conclusion that the majority of low-income workers consume an insufficient quantity of calories to satisfy physiological requirements, on the basis of the standards set up by the Technical Committee of the Health Section of the League of Nations.

The conclusions which may be drawn concerning the adequacy of protein intake by workers are entirely approximate. If 70 grammes per day per adult male weighing 70 kgs. may be regarded as a satisfactory minimum standard, then the intake

of protein by workers in the lowest income group falls below such standard in many countries. The available data also suggest that, within each country, the consumption of animal proteins varies directly with the worker's income, while the consumption of vegetable proteins remains relatively constant.

Available data on fat consumption are scarce. They indicate that fat consumption by workers varies directly with income. Only a few budget enquiries contain data on the consumption of carbohydrates. Those data lead to conflicting results. In Sweden, it would seem that consumption of carbohydrates remains somewhat constant at different income levels. In the United States of America, on the contrary, the preliminary figures show that the consumption of carbohydrates rises appreciably with income.

The data on the consumption of particular foodstuffs by workers show that the quantity of foodstuffs consumed rises with increasing income and that the dietaries become more varied as workers advance along the income scale. At the same time, more adequate amounts of the protective foods are introduced into the diet. Almost all the family budget enquiries examined reveal a considerable rise in the consumption of meat and fish by workers as the income scale is ascended. The expansion is marked in all countries, but particularly so in the relatively poor countries. The consumption of fats and margarine by workers varies inversely with income. In general, it would seem that, at the very lowest level of income, workers concentrate their dietaries on bread and cereals; with the first increases above this level, more cheap fats and meat are consumed; with further increases in income, butter is introduced into the diet.

The data on the consumption of milk, milk products and eggs reveal the same tendency as the data on the consumption of meat and fish. Consumption rises very definitely with rising income. The poorer the country, the greater the spread between the quantities of milk, milk products and eggs consumed by workers at the bottom and at the top of the income scale.

The data on fruits and vegetables are difficult to interpret, because this group contains some of the most important

protective foods—fresh fruits and green vegetables—as well as some of the most bulky energy-yielding foods, such as potatoes and other root crops. In a general way, it appears that, as workers obtain larger incomes, they shift from bread and cereals to potatoes and other root crops for the satisfaction of their energy requirements. With regard to green vegetables, there is a marked tendency for consumption to increase with rising income. Even more marked is a similar tendency in the consumption of fresh fruits.

To sum up, the family budget studies brought together in the International Labour Office report indicate two important facts. First, that the consumption of protective foodstuffs increases greatly with increasing incomes, whereas the consumption of cereals remains more or less stationary. Workers' families with low incomes evidently find the protective foods too expensive and cannot afford them. *The question of income is thus at the root of the workers' nutrition problem.*

Second, an examination of the diets of the different income groups among workers shows that, on the basis of the London standards, the average diet in the lower income groups is inadequate for good health. The inference is that, among such groups especially, there is both malnourishment and undernourishment.

The above statements are based on data which relate to the consumption of food among employed workers. *A priori*, therefore, it might be expected that unemployed workers during the depression of the last few years have found it impossible to maintain satisfactory dietary standards. In fact, such few studies as are available for analysis indicate in general that, with some exceptions owing to special measures of social policy, such has been the case.

2. SOCIAL AND LABOUR LEGISLATION.

There are four main ways in which social and labour legislation touches directly or indirectly on the problem of workers' nutrition :

First, the amount and regularity of the worker's income—during periods when he has a job—are determined in part by

legislation which relates to the fixing of minimum wages and of family allowances, to the promotion of collective bargaining, to the forms in which and the intervals at which wages shall be paid, etc.

Second, the amount and regularity of the worker's income—during periods when he is out of a job—are determined in part by legislation which relates to insurance or relief in case of unemployment, invalidity, old age, etc.

Third, working conditions proper, as they relate to the meal periods during the work-day and the circumstances under which such meals are taken, are a frequent subject-matter of legislation.

Fourth, arrangements under which the employer is fully or partially responsible for the worker's board are also subject to a certain amount of legislative control.

A consideration of nutrition standards does not, as a rule, enter directly into the legislative control of wages, insurance benefits or relief allowances. At the most, such legislative control aims at assuring a "living wage" or a "reasonable wage". These are concepts which assume levels of nutrition actually existent rather than ideal standards. In principle, however, the legislative safeguarding of workers' incomes provides one of the fundamental conditions of adequate nutrition in so far as purchasing power is an important determinant of the worker's food consumption.

A more direct concern with nutrition enters into the legislation which aims at the abolition or the strict control of the "truck system". Basic to this legislation is the belief that the worker will be better paid if paid in cash rather than in food; and that he will be better fed if free to buy at his own will rather than restricted to shops dictated by the employer.

Direct nutritional objectives are also manifest in the laws which require that workers be permitted a pause (or pauses) for a meal (or meals); that the pause or pauses be of not less than a certain minimum duration (half an hour, an hour, an hour and a half, etc.); that sanitary and adequate facilities for taking meals be provided by the employer (in certain establishments, industries or districts where midday meals at home would not be practicable), etc. The importance of such legislation cannot be over-stressed. In almost all countries, the

routine of the worker's meals is adjusted to the routine of the workplace. Unless a proper balance be struck between the two, the worker's dietary is bound to be adversely affected.

Many groups of workers, finally, receive part of their wages in food. This is true of agricultural labourers in general, native labourers in particular, domestic servants, hotel and restaurant employees, and seamen. The nutritional problems of such workers are frequently the subject-matter of direct legislative control. So far as agricultural labourers, domestic servants, and hotel and restaurant employees are concerned, the legislative control tends to be couched in general terms : such workers are to receive "reasonable" amounts of "wholesome" and "substantial" food. With regard to native labourers and seamen, however, the legislative control tends to be much more definite : it often specifies the actual foods and the actual amounts which shall serve as the minimum basis. While such legislation may be misapplied and give rise to abuses, the principle involved is in accord with protective social policy.

The survey of existing labour and social legislation in its bearing on the improvement of workers' nutrition leads to two principal conclusions : first, except in a few special cases (regulation of the truck system and of working conditions ; native labour and seamen), legislation does not attack the problem of nutrition directly or in detail. Second, such efforts as have been made to deal with nutrition in fixing minimum-wage standards, setting the terms of collective agreements, or devising scales of insurance benefit and relief allowances, are based on an empirical approach rather than on scientific studies.

In brief, the gaps between available knowledge on nutrition and the application of this knowledge in legislative practice are very wide indeed. The problem is to bridge these gaps and to bring legislation and public agencies to bear directly upon the groups of workers—low income and unemployed for the most part—whose diets are deficient in quantity and quality. It is a task of relating action for improving workers' nutrition to the general problem of social policy.

The report concludes with an analysis of the educational, research and social-economic problems involved in improving levels of nutrition to the desired standards. These problems call first of all for action on a national plane. But international co-operation is indispensable in order that efforts to improve workers' nutrition may be in harmony with the needs of world economy. It is pointed out that such international measures are part of the general programme of the International Labour Organisation for raising living standards in all countries as a condition *sine qua non* of social justice and peace.

Chapter IV.

SOME CONSIDERATIONS ON THE ECONOMIC ASPECTS OF THE NUTRITION PROBLEM.

It is not necessary to stress the relationship between income and adequacy of nutrition. It is, indeed, obvious that the greatest single cause of defective nutrition in any community is poverty and the ignorance which is often associated with poverty. Elsewhere in this report, emphasis is laid on the importance of disseminating knowledge as to the principles of rational nutrition, and promoting the improvement in dietary practice by educational methods and by public propaganda. But such advice might well seem somewhat ironical if recognition were not first accorded to the fact that defective nutrition is, in the great majority of cases, a consequence of inadequate family resources. The examination of family budgets giving records of household expenditure for sections of the community at different levels of income demonstrates conclusively that a rise in income is accompanied by improvement in diet, and particularly in the direction of a balanced and more rational diet.

It must, however, be borne in mind that the protective foods, the generous supply of which is essential, are relatively costly. It is thus clear that the improvement of nutrition is associated with the maintenance and improvement of the general level of income. Even without effecting any changes in the level of national income or in its distribution, however, some measure of improvement in the standard of nutrition may be attained by better organisation of supplies, by education and by other methods.

In recent years, the standard of living in large areas of the world has been reduced owing to the effect on income of the economic depression and owing, further, to the restrictions on the international movement of goods which have been

imposed during the years of depression. To restrict the power of any people to obtain their foodstuffs at the lowest prices compatible with the maintenance of agricultural supplies must of necessity adversely affect that people's nutrition. The two first essentials of a sound economic policy directed towards improved nutrition are the absence of the restrictions on the supply of foodstuffs that tend to raise prices and provision against avoidable fluctuations in the availability of supplies.

To each individual, however, the availability of supply is a function at once of the physical production of foodstuffs and of his own income. A sudden drop in the general price-level is likely to reduce incomes. In consequence, policy must be directed at once towards stability of general prices (so long as the prices in any country are not clearly out of reasonable relationship with those in the rest of the world) and adequate food supply. The price at which food is obtainable in any modern community is dependent upon international influences, as well as upon the productivity of domestic agriculture. It is therefore necessary to examine both these aspects in any enquiry directed to ascertain how the intervention of public authorities can most effectively operate to bring about improvement in nutritional standards.

The dislocation of international trade which resulted from the crisis fell with exceptional severity upon agricultural exporting countries. One of the outstanding features of the depression was the disproportionate fall in the prices of agricultural products, leading to a restriction of purchasing power in agricultural communities and, consequently, to a limitation of the intake of industrial products. In three years, the price of leading products in the world market fell from the 1929 level by more than 50%, a development which might at first blush appear an ideal one for securing an abundant food supply through international trade. But, in fact, many industrial communities were unable to purchase their necessary supplies of foodstuffs owing to their inability to sell their products to the impoverished agriculturists. Industrial workers fell into unemployment; agricultural produce went into stocks, not into consumption.

Again, in many countries, the excessive fall of the price of agricultural products forced Governments to adopt policies

intended to safeguard the interests of national agriculture. To this end, access to the national market was restricted by duties, prohibitions and quotas, reacting still more severely on the exporting countries and on world prices. Indeed, as the application of these measures has been intensified and extended, the very term "world prices" becomes misleading. There can only be world prices when there are world markets. But the world has been divided into a series of national markets largely isolated from one another and characterised in their isolation by widely different levels of food prices. In agricultural countries, those farmers whose production did not consist mainly of mixed crops for their personal consumption have suffered severely from their inability to sell their produce at remunerative prices and therefore to buy the necessities of life. In industrial countries, where agricultural prices have been kept above the levels ruling elsewhere in an endeavour to protect domestic agriculture, the town workers have suffered at once from unemployment, due to the loss of foreign trade, and from the relative dearness of foodstuffs.

It is not the intention of the Committee to enter into any criticism of commercial or agricultural policies. Conditions since 1929 have been exceptional, and the difficulties with which Governments have found themselves faced have been very real. The Committee desires, however, to draw attention to certain of the effects of these policies upon national nutrition. Unfortunately, the impediments imposed upon the international movements of foodstuffs have had seriously adverse effects on nutrition, even where the aggregate food consumed has not diminished. Sound nutrition demands a mixed diet. When prices of staple foodstuffs are high or when incomes are low, the consumer is forced to abandon the purchase of the more costly foods in favour of those which satisfy at the lowest price the immediate claims of his hunger. But it is exactly the foodstuffs which are in most countries relatively more expensive that constitute the group of protective foodstuffs. Again, few countries enjoy a climate or are so agriculturally organised that they are able to produce all the classes of foodstuffs requisite for sound nutrition. In many cases, restrictions have been imposed on the import of products which are expensive

to produce at home, with the result that the domestic consumer has been forced to forgo products that the most elementary principles of sound nutrition demand he should enjoy.

From the standpoint of national policy, it is thus necessary to emphasise the need for balancing the interests of the poorer consumers in matters of cheap and abundant food supply with the interests of producers. The facts as to the wide contrast between the prices in different countries for certain leading articles of food—for example, butter¹—show that the existing situation is unsatisfactory from the standpoint of the consumer.

Emphasis has been laid on these aspects of the depression and on the harmful effects of certain of the policies that have been adopted in recent years, because they are of immediate and, perhaps, to-day, of predominant importance. It must not be assumed, however, that malnutrition results from the depression. Amongst certain groups of population the depression has intensified the ill ; it has not caused it. Adequate nutrition cannot be assured by a policy directed exclusively towards countering the effects of the depression. The need for a constructive nutritional policy will not cease when the last signs of the depression have disappeared.

The level of food prices must depend primarily on the operation of agricultural and trade policies. There are, however, other methods for alleviating the defects of nutrition caused by the reaction of food prices on consumption. There are, for example, various forms of direct action by which the State or public authorities can bring the supply of essential food products within the reach of the low-income and impoverished sections of the community. At the same time, there is a vast field for activity in the attempt to promote better market organisation and to bring producer and consumer into closer contact.

As was stated at the beginning of this chapter, the main cause of malnutrition is poverty. Malnutrition can never be

¹ See "Workers' Nutrition and Social Policy", International Labour Office, 1936, pages 112 and 113 :

"The ' world price ' of butter in the year 1934 was 1.72 Swiss francs per kilogramme. In Italy, the price was 3.03 Swiss francs ; in France, 3.55 Swiss francs ; in Germany, 3.79 Swiss francs ; and in Switzerland, 4.75 Swiss francs. The differences between these national prices and the world price of 1.72 Swiss francs must be attributed to the effects of tariffs, quotas and other restrictions."

overcome when poverty is its principal cause, except by increasing the income of the poor. The income of the poor may be increased directly by an increase in national production, whether that results from the application of a sound economic policy or from increased knowledge of the art of production. It may be increased indirectly by public assistance, whether that be afforded in cash or in kind or in such a combination of these two as is constituted by rendering essential foodstuffs available to the poor at specially low prices.

When public assistance is afforded in kind or by means of price privileges, it is of the greatest importance that it should be guided by sound nutritional precepts and that those foodstuffs should be selected of which the lack is the most real.

The case of milk deserves special attention in this connection. Milk is of outstanding importance, not only because of its unique significance for the diet of children, but also because of its high protective value for general consumption. The supply of milk, moreover, is a matter which inevitably must engage the attention of public authorities and be submitted to careful control in order to establish a high standard of purity.

The problem of the margin between the price received by the agricultural producer and the price paid by the housewife is one of long-standing prominence in connection with discussions on food supply. It has often attracted attention from Governments and been made the subject of official investigation, in the hope of suggesting remedies for the glaring anomalies that may often be discerned where the original and final price for a particular article of food are compared.¹

Governments have from time to time endeavoured to check an increase in retail prices by measures of direct control. Experience has gone to show that such direct control, to be effective at all, requires to be so far-reaching and intensive as to lead to what is tantamount to a monopoly of sale and distribution, and frequently to the rigid allocation of orders amongst the various producing units. Economies in organisation may be effected and overhead costs reduced ; but, on the other

¹ The question of price margin between the producer and the consumer was studied by the Economic Committee of the League of Nations in 1930 and 1931 (see "The Agricultural Crisis", document C.239.M.105 1931. II.B, Vol. II).

hand, there is a grave danger that the whole system of control may tend to raise rather than lower prices to the consumer, for the costs of the less efficient producers and distributors tend to become the standard for the whole market. Maximum costs tend to become standard costs and to determine the minimum prices.

This whole problem of price control is an extremely complex one on which it would be as unwise to dogmatise as unsafe to generalise. But the evidence before the Committee seems to indicate that, as a general rule, measures designed to reduce costs, whether by lowering import duties, reorganising distribution or facilitating the adoption of improved methods of production, are more likely to achieve the desired object of reducing prices to the consumers without prejudice to the efficient producer or distributor than are measures of direct control or central price fixation.

This is a question where detailed and patient investigation is essential if useful results are to be achieved. It is natural that, in a market for perishable goods where the supply is variable, the most efficient marketing system should occasionally break down owing to the undue concentration of supplies at a particular point or at a particular period. It is not with such abnormalities that this enquiry is principally concerned, but with the divergencies between wholesale and retail prices which are of a stable and normal character in markets for essential food supplies. There is a widespread belief that the cost of handling, transport and distribution forms in many cases a disproportionate element in the final price. This is especially noticeable at a time when agricultural depression has reduced the wholesale price and the return to the producer is inadequate. In such circumstances, the problem cannot be lightly passed over and, in view of its outstanding importance to the interests of sound nutrition, it is desirable that continuous attention should be directed towards it. What is required is patient investigation which will build up the necessary volume of practical knowledge as to existing systems of marketing, from which it will be possible to deduce conclusions as to improvements and remedies for maladjustments in the existing system. In general, it will be found that there is a very large

field of action in which remedial measures may be applied, having for their object the creation of more adequate marketing facilities or the encouragement of more efficient marketing organisation.

One important method of making food available at reduced prices is that of reducing the services provided by the distributor. This can be secured by charging special prices for sale across the counter for cash, thus eliminating the costs of credit trading, door-to-door delivery, etc. This allows the price of the commodity sold over the counter to be lowered much closer to its cost of production, and the people whose purchasing power is too low to afford purchase at full retail price can obtain the commodity at a substantially reduced cost. ¹

Again, in countries where standards of reference for grading foodstuffs according to quality have been developed by Government agencies, certain foods, graded by men trained and supervised by the Government, are sold with labels phrased in terms of the specifications with which they have been graded. The practice has possibilities: on the one hand, for promoting efficiency in the marketing of farm products, and, on the other, for effecting economies in consumer purchasing which would not otherwise be possible. ²

Finally, reference must be made to the influence, in this field of action, exercised by producers' and consumers' co-operatives. These organisations, in many countries, achieve a considerable measure of success in their endeavours to reduce the cost of goods to the consumer. ³

¹ In Northern Ireland, for example, a scheme such as this is in existence for the sale of milk. By this means, after a certain hour, milk is made available at less than half the normal price charged when delivered.

See also in Volume III, chapter V (United Kingdom), the account of an experiment conducted at Bishop Auckland by the Potato Marketing Board.

² In Canada, grading of fresh and canned fruits and vegetables according to Government standards has been very successful in decreasing distribution costs, and in making possible consumer education as to the cheapest way of buying an adequate diet. In the United States, Government standards have recently been established for grading meat, butter, eggs, potatoes, a few other vegetables and some fruits.

³ See, for example, Volume III, Chapter V, under France, Italy, etc.

Chapter V.

NUTRITION AND AGRICULTURE.

I. MALNUTRITION AMONG AGRICULTURAL POPULATIONS.

In considering the relationship of the problem of nutrition to agriculture and the implications that the new teaching on the subject may have for the agriculturist, it is necessary to bear in mind that, in the world as a whole, the agricultural producers are at the same time the main consumers of foodstuffs. Even in European and other countries with what is termed a Western civilisation, agriculturists constitute a large and important section of the total community—in many cases exceeding one-half of the whole population.

The prosperity of the farmers, peasants and agricultural workers is therefore an essential element in any policy directed towards improved nutrition.

Further, countries exporting agricultural produce and the agricultural elements in other countries constitute one of the main markets for industrial products. Depression in agriculture is reflected in unemployment in industry. Nutritional standards, therefore, will not be improved, but worsened, by policies which fail to maintain sound economic conditions in agriculture.

Before approaching the question of the possible repercussions of changes in popular nutrition on the interests of agricultural producers, therefore, it is well to remind ourselves that those who live by farming are not necessarily immune from the risks of malnutrition. The old saying, "Peasants have always enough to eat", is belied by the almost tragic situation of large masses of the rural population, particularly in Eastern Europe, living on land which either can only supply them with food during part of the year, or produce crops intended, not for personal consumption, but for sale. Such agriculturists have always been obliged to purchase elsewhere the additional food they

require. They were able to do so as long as the proceeds from their sales or the income from their minor industries remained at a reasonable level.

The distress among agricultural populations has, of course, been greatly intensified as the result of the crisis; and this is true of communities in relatively rich countries no less than in the relatively poor. To-day the situation is such that bare nourishment—not to speak of rational nourishment—is often problematical; and this state of affairs has lasted for several years, with disquieting results to general health and particularly to the health and growth of children.

By way of example, reference may be made to countries so widely different as Yugoslavia and the United States of America.

Yugoslavia contains certain regions which are able not only to supply themselves with vegetable products but even to engage in export; other regions, however, do not produce sufficient food (particularly wheat), and the people secure a bare living by breeding nondescript live-stock or growing miscellaneous products for export, such as tobacco, wine, wood, medicinal herbs, etc. The population of these latter regions, called "passive" from the point of view of nutrition, lives for the most part in a state of under-nutrition on account of its feeble purchasing power resulting from the fall in the value of its exports.

This state of affairs has for long been in existence and formerly the population resorted to emigration as a remedy. The emigrants helped their families by sending them money from abroad. These contributions amounted until 1929 to about one thousand million dinars per annum, most of this money being sent to the poorer regions. Contributions from abroad have since fallen to about 120 million dinars per annum. This fact, coupled with the impossibility of emigrating, has caused great hardship in these areas, particularly from the point of view of nutrition.¹

Turning to the sharply contrasted circumstances of a country such as the United States of America, we find a situation, as

¹ For a fuller account see Vol. III, page 63.

described by the Federal Emergency Relief Administration, in some degree analogous to the foregoing :

“The relief situation as shown by a sample study of nine major agricultural areas in February 1935 presents striking differences among the areas and reflects clearly the severity of conditions existing either temporarily or permanently in these areas. Effects of the drought are particularly noticeable in certain sections and a permanent condition such as exists in the Lake States cut-over¹ area has forced on the relief rolls almost 40% of the rural families in that area. This study also brings out the unfavourable position of non-farm families as compared with farm families; the unfavourable status of the tenant and share-cropper groups as compared to the owner-operator group is also disclosed.

“Out of 5,200,000 households (cases) receiving emergency relief under the general relief programme in February 1935, it is estimated that there were about 1,900,000, or 36%, located in rural areas, and 188,000, or 4%, in small towns of 2,500 to 5,000 population.”²

The state of privation thus depicted is due in large measure to the catastrophic fall in agricultural prices; and this in turn has been an obstacle which still bars the way to the return to a normal condition of international trade. The agricultural crisis is intimately linked with the international commercial crisis, and the essential basis for the restoration of the purchasing power of the farming community is to be sought in increased demand and a rising level of prices.

In the face of this general depression, which so seriously affected the agricultural community, Governments almost throughout the world adopted special measures in the endeavour to protect the agriculturist from the effects of the slump in prices and the growth in the burden of debt due to that slump. Certain of the measures adopted have, unfortunately, by blocking the channels of trade, increased the ills it was intended to avert or to cure.

¹ Deforested.

² Monthly Report of the Federal Emergency Relief Administration for July 1935, page 31.

2. IMPROVED NUTRITION AND AGRICULTURAL PRODUCTION.

Attention has been concentrated chiefly on the question of the surplus productive capacity which at present encumbers the activities of certain branches of agriculture in many countries and of the surpluses which are at present choking the market in certain products. This situation presents, undeniably, a problem of great immediate importance. But the utilisation or reduction of such temporary gluts as may exist at the present moment by no means exhausts the potential importance for agriculture of a dissemination of better dietary habits. While the problem of surpluses, in itself closely linked up with under-consumption,¹ is of a more or less casual nature, the position is quite different as regards the deep and permanent effects which dietary changes, as conceived by scientists, may have on the actual structure of agriculture, more especially in all the countries where the economic system offers the features usually met with in Western-European countries.

The Mixed Committee has received overwhelming evidence that there is ample scope, even in Western Europe and the United States of America, for a great increase in the consumption of many forms of food, while in the world as a whole there is need for the increased consumption of all foods. This evidence is fully supported by the information contained in the report of the International Labour Office.² There can, therefore, be no doubt that the real interest of nations demands, not a restriction of agricultural production, but the discovery of means whereby the real needs of each community for the health-giving foods may be correlated to the undoubted power of agriculture to produce all that is necessary for abundant health.

¹ "These expressions (over-production and under-consumption) which have been so loosely used in speaking of the economic depression obviously correspond to purely relative notions. The fact that to-day, in the countries of Europe as a whole, more meat or more butter is produced than was being produced before the war does not prove that this increased production could not be absorbed if the mass of the population, which has also increased, found itself in a normal economic situation. One need only think of the millions of people who are unemployed or under-fed to realise that the disparity between supply and demand must to a large extent be attributed to the falling-off in the number of persons possessing the wherewithal to purchase the commodities in question at the high prices kept up by the protectionist system." (See "Considerations on the Present Evolution of Agricultural Protectionism", document C.178.M.97.1935.II.B.)

² "Workers' Nutrition and Social Policy", International Labour Office, 1936.

The Committee, in this interim report, is not attempting to put forward any general solution of either national or world agricultural problems. More information is required before that can be attempted. Nevertheless, the effects upon agriculture that would follow from the adoption by many countries of sound national nutritional policies would be so considerable that the Mixed Committee has felt it desirable to indicate certain of those effects now, if only by way of illustration.

Hygienists have come to the conclusion that, if, particularly in countries with Western civilisation, there is to be the necessary physical strength and health, it is essential that all classes of the population, and primarily children and young people, should be able to consume regularly certain quantities of "protective foods". Fresh milk and fresh vegetables are nearly always produced and sold on the spot or within a comparatively limited area, and the same may be said of many fruits and of a great deal of dairy products, eggs and fresh meat. It follows from this fact that an increased demand for such produce would probably be met in the main by the output of national agriculture, and that, on the other hand, countries would probably resort to a greater extent to international and, more particularly, inter-continental trade to satisfy the demand for certain other products, such as cereals, sugar and frozen or chilled meat.

Moreover, it is a striking fact that an increased output precisely of the protective foods just referred to would fit in admirably with the typical agricultural structure of European countries with a mixed economic system¹ where the rural population consists mainly of small landed proprietors and small farmers. Such conditions are hardly favourable to the large-scale production of single crops (wheat, maize, etc.), which is better suited to the conditions in countries in the Eastern belt and oversea countries; they are, on the other

¹ "Nor must it be forgotten that the agricultural system of the older countries already existed, practically in its present distribution, at a time when the world movement of agricultural products was non-existent and when, consequently, the particular development of that agriculture corresponded to essentially local requirements. The peasant class in those countries still retains this former character, as regards both distribution and manner of living—a fact which places it in a position of relative inferiority in relation to oversea countries and often even in relation to certain Eastern-European countries, especially for big-scale production." (See "Considerations on the Present Evolution of Agricultural Protectionism", document C.178.M.97.1935.II.B.)

hand, very favourable to small-scale production such as is needed to meet the varied requirements of modern nutritional hygiene.

It is therefore probable that, if the dietary advocated by hygienists could be extended to the bulk of the population, local agriculture in those countries would be called upon to supply much larger quantities of protective foods. It would be very useful if it were found possible to estimate the extent of the changes which such an evolution might bring about in the various categories of agricultural production in particular countries and consequently in the areas which would in future be devoted to different crops. Much additional information is, however, needed before such calculations can be made. To mention only one obstacle, the "optimum" dietary is at present only expressed as a scientific formula. The general rules of nutrition have not yet been translated into national or local dietaries, and, even if they were, it would still be a moot point to what extent the new requirements would be met by national agriculture and to what extent by importation. This must depend on climate, soil, degree of agricultural specialisation, etc. The Mixed Committee hopes to go further into this question in its next report. It may at once be asserted, however, that an increased demand for protective foods would be calculated to introduce into agriculture, particularly in countries of the Western-European type, changes which would add to the prosperity of the agricultural community.

3. CAN AGRICULTURAL PRACTICE BE ADAPTED TO MEET THE NEW REQUIREMENTS OF BETTER NUTRITION ?

The question next arises whether the agricultural transformation considered above can be brought about, and especially whether it can be brought about at a rate corresponding to the contemplated changes in dietary practice. In other words, is agriculture, and more particularly the agriculture of Europe, in a position to respond to an increasing demand for protective foods? Fortunately, the Committee finds itself able to reply to this question in a very positive way.

Although the application of science to agriculture occurred later than to manufacturing industry, the effects have been cumulative. It would be difficult to say which branches of science have had the greatest effect upon agricultural production. Advances in agricultural engineering have reduced costs through mechanisation, increased knowledge of the nature of soils has made fertilisation more effective, the art of animal breeding is being fortified by the science of genetics. Perhaps the most spectacular advance, however, is due to the work of the plant-breeder. Owing to the patient endeavours of many workers in many lands, new varieties of economic plants are constantly being evolved. As a result, higher-yielding strains, resistant to plant diseases, are replacing other types of wheat, maize, sugar-cane or beet, root crops, fruit trees, or vegetables.

The work of Dutch plant-breeders in Java resulted in doubling the yield of sugar-cane per acre, with the result that the island's production was increased by 100% without any increase in the area devoted to sugar.

New varieties of early-maturing wheat have enlarged the wheat belts of Canada by enabling the crop to be harvested further and further north; at the same time, drought-resistant types have made wheat-growing possible in the drier parts of the Middle West of the United States of America, Russia and Australia.

The achievements of the plant-breeder on grasses and fodder crops are even more important so far as the supplies of protective foods are concerned. The selection and crossing of grasses, clovers, lucernes and other fodder crops are continually making possible the increase in the number of cattle or sheep carried on farms. Thus, in New Zealand, over the last three years, production of butter and meat has increased enormously without any material extension of the acreage on which the flocks and herds are depastured.

Farmers are conservative people, and the lag between scientific discovery and the full utilisation of the resultant improvements in agriculture may often be as long as one or two decades; but, with the spread of agricultural education, increased production now follows new discoveries with increasing rapidity. There

is certainly now no doubt that world agriculture can respond to increases in world demand for food as rapidly and as fully as there is any prospect of that demand arising.

While this is certainly true of world agriculture, can the same be claimed of the national agriculture of the various countries? Here the answer must be somewhat different. In almost every country there are possibilities of great further increases in the yield of crops, of pastures and from farm animals. Where farming has been carried on in an intensive way with a wide utilisation of scientific discoveries, the possibilities of further spectacular advances are less striking than where agricultural methods have been extensive rather than intensive or have remained traditional; but, even in Denmark or New Zealand, there is still room for higher efficiency, while in most countries it would be no exaggeration to claim that the full utilisation of the already fully ascertained results of science could immensely increase production.

One most important economic aspect of the improvements in plant and animal breeding must not be overlooked—namely, the effects upon cost of production. Experience has shown that better yielding and more resistant types cost no more to grow and harvest or tend than the poorer varieties. General speaking, marked reductions in agricultural costs follow from the utilisation of the breeder's work.

All national agricultures can therefore be expected to respond to increased demand by increased production, but it is not necessary to envisage that countries must obtain the whole of their requirements from their own soil. Indeed, if the nutritional campaign is to achieve its full effects on public health and to assist towards a revival of world trade, then a most important factor must be that Governments should exercise a wise discrimination in regard to the types of farming they will encourage in their own countries.

Here we find a task which Governments might well refer to their National Nutritional Councils.

The Councils might survey the national food consumption, compare this with the levels of consumption which science has demonstrated to be necessary for health, consider how far the national agriculture can be relied upon to make up the

deficiencies at reasonable cost, and how far it would suit the general national economy to rely upon importation.

The Committee thus foresees a gradual reorientation taking place in the agriculture of the industrial countries. With the growth of demand for the protective foods, farmers will produce more milk, more vegetables, more eggs and will become less concerned over the price of wheat or of sugar.

The outlook is one which Governments will welcome; for a state of affairs is foreseen in which national agriculture will be fully maintained or, indeed, increased, while there will be room for increased importation and hence for the export of manufactures. Apart from this general reorientation of agricultural policy and practice, the Committee considers that there is room for special arrangements between organised producers in different countries based on the seasonal differences in periods of production. A northern country could arrange to obtain supplies of vegetables from a southern one during early spring and herself become the exporter at a later part of the season.

The Committee attaches the utmost importance to this whole question of the organisation of national and world agriculture to meet the national and world needs for adequate supplies of food at reasonable prices and proposes to study the whole subject more fully in order to place more information before the Assembly in its next report.

4. THE EFFECTS OF AGRICULTURAL ADAPTATION ON THE ECONOMICS OF FARMING.

There can be little doubt that the progress of science and its technical application makes it possible to modify agricultural practice and to increase the output of particular products. The question remains, however, whether this adaptation will not necessitate important economic and financial adjustments. This aspect of the problem merits the most careful study by the countries concerned; meanwhile, it is difficult to reach a general conclusion, having regard to the very different conditions which are found in different countries. It can,

however, be said that expert opinion unanimously holds that fairly wide possibilities of substitution exist in most European countries, specially adapted for the production of the foodstuffs in which we are interested, and that such substitution would not have a harmful and disturbing effect provided, of course, that it were carried out gradually, by a natural process, contemporaneously with the changed demands of consumers.

It must, nevertheless, be realised that farmers in many countries, but especially in those with limited financial resources, will be handicapped in their endeavours to adjust their production to changes in demand owing to the lack of capital.

In almost every country in the world, the return on capital invested in agriculture is too low to attract sufficient money to enable the farmer to make adequate use of scientific improvements. The recognition of this state of affairs led to both the League of Nations and the International Institute of Agriculture studying the question of agricultural credit, and the question of the foundation of an international agricultural credit bank has been considered by the League of Nations.

The Committee has not been able as yet to study how far the factor of inadequate capital may handicap farmers in carrying out their part in the nutritional campaign, but it proposes to obtain information on this aspect and hopes to present its conclusions in its next report.

Closely allied to this question of agricultural credit is the possibility that producers' co-operative organisations might play a useful part in facilitating the reorientation of production towards the protective foods through the financial assistance they afford to farmers. This question, too, the Committee hopes to be able to study more closely.

Further, to the extent that foods of animal origin, such as eggs, meat and dairy produce, took the place of other production, there would be a fresh demand for vegetable produce for use as seed or fodder, over and above that intended for direct human consumption. Thus, a human diet involving a larger proportion of foods of animal origin would entail a wider demand for the produce of the soil, a demand which, as it could and probably would have to be met by the products of agricultural exporting countries, might tend to improve the

situation of those countries and to improve international trade in certain agricultural products.

The question might be asked whether a shift of consumption in the direction of protective foods might not be detrimental to the production of cereals and other energy-producing foods which, as should not be forgotten, have for centuries constituted, and still constitute, the basic dietary of populations of the Mediterranean type.

From the purely economic standpoint, the reply might be given that, if a change of production is the result of a spontaneous development in taste and if it is not thwarted by an agricultural policy opposed to such a development, the change from one form of production to another will be made only in so far as the farmer finds it to his interest to do so.¹

From the standpoint, again, of a country's food supplies, it is perfectly well known that there need never be any difficulty in meeting through world trade a demand for cereals which is not fully covered by national agriculture. This would have the advantage, first, of promoting trade between the various countries and continents, and, secondly,² of maintaining the efficacy of such a reasonable system of Customs protection as the European countries would probably think it necessary to maintain.

¹ The transformation which occurred in Denmark, from a country still exporting cereals in 1880 into a country with a large export trade in milk products and meat, is an example which merits careful examination. This transformation has made necessary a great increase in the supply of feeding-stuffs for cattle, a demand which has been met by an ever-increasing importation of cereals and oil-cake accompanied by a marked intensification of domestic cultivation.

The area devoted to cereals remains to-day, as in 1880, 41% to 42% of the agricultural area; but the area under root crops has risen from less than ½% to 14% of the agricultural area, while the area under fallow has almost disappeared. The importance of the land under green crops—clover and grass—in the crop-rotation system reached its maximum at the end of the nineteenth century. To-day, these areas do not form more than 22% of the agricultural area. Since the war, the cultivation of permanent grass crops has been developed on land not coming within the area of crop rotation.

The yield of all crops, reckoned in crop-units, increased between 1880-1884 and 1929-1933 by 163%, a development greatly accelerated in the last ten years. The yield of crops other than cereals has risen in these fifty years by 240%, though this has not prevented an increase in cereal crops of 70%.

The exportation of agricultural products has developed as follows:

	Butter	Condensed milk and cream (Millions of kilos)	Bacon	Eggs (millions)
1881-1885	14	—	8	60
1931	172	19	376	980

² “. . . agricultural protection far more than industrial protection must be moderate if it is to be really effective.” (See “Considerations on the Present Evolution of Agricultural Protectionism”, document C.178. M.97.1935.II.B.)

To the extent that demand tends to be transferred from energy-producing foods to protective foods, the prices of these two categories will not fail to adjust themselves in the same proportion. This adaptation will, in itself, act as an effective regulator of production.

In conclusion, there are good reasons for believing that the trend of dietary habits, particularly in countries with a Western civilisation, towards a larger consumption of protective foods would coincide with a parallel evolution of agricultural production, which would in all probability benefit the rural populations of the various countries, and might also greatly contribute to a resumption of normal economic relations between the nations.

Chapter VI.

PRELIMINARY RECOMMENDATIONS.

The Mixed Committee, as the previous chapters show, has directed its attention during the past year, in the main, to one part of its terms of reference—namely, Nutrition in Relation to Public Health. Its observations about the economic and agricultural aspects are of necessity preliminary. On the other hand, the Committee attaches great importance to the beneficial effects upon agriculture and trade which this movement may have. It proposes to go more fully into this side of the question in a later report.

Abundant evidence has been laid before the Committee to show that improved nutrition can bring about notable advances in human well-being, and, secondly, that the peoples of many countries, in so far as their financial circumstances permit, are tending to adopt more rational diets, with consequent beneficial effects. If, however, this welcome trend towards better nutrition is left without public guidance and assistance, many years must elapse before the mass of the people of any nation derive full benefit from the discoveries of science. Happily, it is within the power of Governments to accelerate this movement and thus to secure for the rising generation the physical benefits to which it is entitled. Public expenditure to this end might well be regarded as a premium paid on behalf of the whole community with every prospect of recouping the sums spent, not only directly in savings on medical services and assistance of many kinds, but by increasing the national assets by securing a healthier and more vigorous people capable of happier lives and increased productivity.

No one studying the ample documentation summarised in Volume III of the present report can fail to be struck by the interest already aroused in numerous countries by questions relating to nutrition. In submitting its report and recommendations, the Mixed Committee has been inspired

by the desire to maintain and foster this interest, to make it universal and to stimulate the movement for better nutrition through international action.

RECOMMENDATIONS OF THE MIXED COMMITTEE ON THE PROBLEM OF NUTRITION.

The Mixed Committee, while recognising the importance of the economic aspects of the nutrition problem, the fuller treatment of which it desires to reserve for a later report, submits to the Assembly the following preliminary recommendations, in the hope that, if they are approved by the Assembly and accepted by Governments, they will make a real contribution to the improvement of nutrition.

In order to promote endeavours to secure an adequate provision for all their people of necessary and, more especially, of protective foods, the Mixed Committee suggests to the Assembly to recommend that Governments should :

(1) Encourage and support in every possible way the further scientific study of nutrition problems with a view to ascertaining the optimum nutrition for each country, due consideration being given to differences of national economic structure, of climate and of available sources of supply ;

(2) Take all appropriate measures to ensure that the latest information about nutrition is included in the teaching of medical students and that medical practitioners, medical officers of health, district nurses, etc., have such information constantly brought to their notice ;

(3) Conduct a vigorous policy of education on popular nutrition for the instruction of the general public in this subject ;

(4) Support the Health Organisation of the League of Nations, not only in the work of its technical committees, but also in its endeavours in the field of public health and preventive medicine to promote the application of modern nutritional science for the benefit of the different age and occupational groups of the population ;

(5) Facilitate and promote international co-operation in education and propaganda and in the exchange of information, and, in particular, encourage all appropriate international organisations to lend their help ;

(6) Consider what steps should be taken, whether at the public charge or otherwise, to meet the nutritional needs of the lower-income sections of the community, and, in particular, the means by which they might ensure that adequate supply of food, especially safe milk, should be made available for expectant and nursing mothers, infants, children and adolescents ;

(7) Consider what further steps might be taken to meet the nutritional needs of adults, unemployed or otherwise in distress.

(8) With a view to giving the fullest possible effect to national propaganda and educational efforts for the improvement of popular nutrition :

Take all possible steps to make food supplies, and especially protective foods, so far as possible, available at prices within the reach of all classes of the community, while at the same time safeguarding the interests of the producers ;

Take steps to improve and cheapen the marketing and distribution of foodstuffs in both industrial and rural districts, and, with these objects in view :

Encourage collaboration between co-operative and other forms of producers' and consumers' organisations ;

(9) With a view to assuring purity of food and in the interest of public health, promote, so far as possible, the international unification of the technical analysis and control of foodstuffs, and of the control of preparations sold primarily for their vitamin content on the basis of the work being conducted on standardisation of biological products ;

(10) Set up standards of reference and specifications for grading foods of all kinds according to quality ;

(11) Consider whether any modification of their general economic and commercial policy is desirable in order to ensure adequate supplies of foodstuffs, and, in particular, to assist the reorientation of agricultural production necessary to satisfy the requirements of sound nutrition ;

(12) Co-ordinate the work done by different authorities which affects the nutrition of the people and, in the absence of a central authority, set up a special body for this purpose, in order to secure unity of policy and direction ;

(13) In order, *inter alia*, to ascertain how far existing national dietaries fall short of the new standards of nutrition, collect information on food consumption by families of different occupational groups at different income-levels as well as on the distribution of the population by family income ;

(14) Consider to what extent and by what means their national statistics of the supply and consumption of individual foods might be improved ;

(15) Assist the International Institute of Agriculture in collecting information regarding supply, national consumption and prices of foodstuffs.

* * *

Furthermore, the Mixed Committee invites the Assembly to recommend the Governments concerned to give their full support to the Health Organisation in its enquiries into the widespread malnutrition which exists in the tropics and certain Far-Eastern countries.

[Communicated to the Assembly,
the Council and the Members of
the League.]

Official No.: **A.12** (a), 1936.II.B.

Geneva, June 24th, 1936.

LEAGUE OF NATIONS

2

THE PROBLEM OF NUTRITION

VOLUME II

REPORT ON THE PHYSIOLOGICAL BASES OF NUTRITION

drawn up by the

Technical Commission of the Health Committee

*at the meeting held in London (November 25th-29th, 1935),
revised and amplified at the meeting held at Geneva
(June 4th-8th, 1936).*

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INTRODUCTION

For ten years, the Health Organisation of the League has been engaged in the study of nutrition in relation to public health. The following have been the main stages of the work:

In 1925, upon the proposal of the Yugoslav delegation, the Assembly (sixth session) requested the Health Committee to study "the methods to be recommended in the interests of public health for the regulation of the manufacture and of the sale of food products."

In October 1928, at the thirteenth session of the Health Committee, Professor Léon Bernard asked, on behalf of the French Government, for nutrition to be placed on the programme of work of the Committee.

In 1926, the Health Section published a collection of memoranda on the physiology of nutrition and its applications by Professor T. Saiki, Director of the Imperial Institute of Nutrition of Tokyo, and his assistants ("Progress of the Science of Nutrition in Japan", document C.H.523).

In 1927, Professor T. Saiki, under the auspices of the Health Organisation, gave a series of lectures on nutrition in the United States of America, Argentine, Brazil and Chile. The same year, the Chief of the Department of Applied Science in the Institute of Tokyo came to study problems of nutrition in the United Kingdom with Professor Mellanby, and afterwards in different institutes and laboratories of Europe.

In 1926-27, the Health Section arranged for the visit of the late Professor Egerton Grey of the University of Cairo to the Tokyo Institute, and published in 1928 his valuable report entitled "The Food of Japan" (document C.H.861).

In 1931, the Health Committee organised a collective tour to study the supply of milk in the United States. Two of the participants, Professor R. Burri and Dr. G. S. Wilson, summarised their observations in memoranda published in the *Quarterly Bulletin of the Health Organisation*, Vol. I, Nos. 1 and 4. At the same time, the hygiene of milk was studied by Professor J. Parisot in the Department of Meurthe-et-Moselle (*Quarterly Bulletin*, Vol. III, No. 4).

In 1932, the Government of Chile requested the collaboration of the League of Nations in a study of popular nutrition in that country. The preliminary studies led to a double enquiry—economic and medical—which was begun in 1935.

In October 1932, at its nineteenth session, the Health Committee decided to undertake the study of the effects of the economic crisis on public health, with particular reference to conditions of under-nutrition produced by the crisis. In the *Quarterly Bulletin* was published in 1933 a study by Dr. Mackenzie on the administrative machinery by which the nourishment of the poor is assured in the United Kingdom (Vol. II, No. 2) and a study by Dr. W. R. Aykroyd on "Diet in relation to Small Incomes" (Vol. II, Nos. 1 and 2).

In 1932, two Conferences of Experts were convened in connection with the studies on nutrition. They did not only deal with the conditions brought about by the economic crisis, they also considered the fundamental data of the problem and dealt with the principles of an adequate diet.

(a) The Conference of Experts at Rome (September 1932) considered the question of dietary standards and drew up a scale of family co-efficients for inter-

national use in order that the enquiries on the state of nutrition in various countries might be made comparable.

(b) The Conference of Experts in Berlin in December 1932 considered the physical standards and the clinical and physiological methods best calculated to detect states of malnutrition.

The reports of these two Conferences were published in the *Quarterly Bulletin*, Volume I, No. 3, and Volume II, No. 1. They may be considered precursors to the report of the London Conference which is published hereafter.

* * *

In 1934, in view of this work and of all the documentation collected, the Health Committee, when drawing up its three-year programme of work, decided that a general report on nutrition should be made (see document C.233.M.97.1934, page 12). The preparation of this report was entrusted to Dr. E. Burnet and Dr. W. R. Aykroyd, who carried out a series of enquiries in different countries (United Kingdom, France, United States, Denmark, Sweden, Norway, and the U.S.S.R.) on the special institutions of nutrition policies of these countries. This report was drawn up in the early part of 1935, and published in the *Quarterly Bulletin* (Vol. IV, No. 2, June 1935).

This report, which was specially intended for health administrations, deals with the position of nutrition in public health and preventive medicine.

Nutrition in relation to health is one of the most important aspects of preventive medicine, and the recent progress in the science of nutrition makes it essential for public health to develop along new lines.

Nutrition is put forward, not only as a physiological problem, but also as an economic—agricultural, industrial and commercial—problem.

Health workers are appealing to the economists for the realisation of their plans. Economists beginning to be guided by the lofty aims of preventive medicine. The time will soon be over when commercial agreements and Customs measures are applied without consideration for the requirements of the masses and of public health.

The plan indicated by the table of contents at the beginning of the report appears at first sight to be somewhat complicated. In reality it is very simple and hinges upon three main questions:

- (1) *What are the nutritional needs of the human being ? How can they be recognised ? How can it be determined whether they are being satisfied ?* (Dietary standards and physical standards.)
- (2) *What resources are available to meet nutritional requirements ?* (Food available; production; distribution; preservation.)

One chapter emphasises the relationship between nutrition and economy, based on examples taken with respect to four fundamental foods of great importance; meat, milk, bread and fats.

- (3) *How best to utilise the resources available in order to meet these requirements ;*

Nutrition has already been recognised as a means of protecting maternity and childhood, of controlling the deficiency diseases (rickets, dental caries, anæmia, pellagra, beri-beri) and of ensuring the regular development of the human being in its various surroundings; in the urban centres, rural districts, or the colonies.

Certain countries, as, for example, the U.S.S.R., have already organised extensive public or collective nutrition, including preventive or curative diets.

In order to formulate adequate *diets*, it is necessary first to consider the various nutritional types.

It is no longer necessary to consider whether Governments should intervene in connection with nutrition because in point of fact such intervention has existed for a considerable time. The report gives examples of organised nutrition.

The report not only does not omit, but rather emphasises on each page, the economic conditions in relation to adequate nutrition. It concludes with this statement: " Production, distribution and consumption have hitherto been considered mainly as economic problems without sufficient regard to their effect on public health, but the effect of the economic depression has directed attention to the gap which almost everywhere exists between dietary needs as determined by physiology and the means of satisfying them under existing conditions. *The general problem of nutrition as it presents itself to-day is that of harmonising economic and public health development.*"

In another part of the report (see Chapter on Nutrition and Poverty), the authors have not overlooked the psychological aspect of the question. If salaries are, so to speak, the " iron law " in regard to nutrition, it is not sufficient to increase them in order to do away with all nutritional deficiencies which accompany poverty; it is also necessary (and not only amongst the poor) to develop *education*: education of medical men, of health workers, of mothers, and of the whole population from infancy upwards; the education of those engaged in teaching the public, and the education of the public itself.

The report by Drs. Burnet and Aykroyd was published at a time when the social problems of housing and nutrition were definitely occupying the foremost position in public health. Continuing the work carried out by the Rome and Berlin Conferences, it thereby met the preoccupations arising out of the protracted economic depression. It contained the essential elements for a general discussion of the practical problems of nutrition in relation both to public health and to economic recovery. It was therefore natural that it should be used as a basis of discussion when the delegations of twelve Governments at the sixteenth Assembly of the League (September 1935) requested that nutrition should be placed on the agenda.

The discussion in the Second Committee of the Assembly was introduced by Mr. Bruce (Australian delegate), who stressed the necessity for marrying agriculture and public health in the interests of the latter; of increasing the consumption of protective foods as a remedy for malnutrition and the agricultural crisis, and of changing the incidence of State protective subsidies so that they should serve to increase consumption rather than to restrict production. He pointed out the

necessity for reducing the wide gap between wholesale and retail prices and of reducing the costs of distribution.

The following points emerged from the discussion:

- (i) An increase of production supplies the Governments with further means for improving public health;
- (ii) This can be done by expanding the work that they have already begun in the field of nutrition;
- (iii) This constitutes a direct and practical means of attacking the problem of agricultural surpluses and the consequent fall in prices.

On consideration of the report of Lord De La Warr (United Kingdom), the Assembly adopted the following resolution:

“ The Assembly,

“ Having considered the subject of nutrition in relation to public health and of the effects of improved nutrition on the consumption of agricultural products, urges Governments to examine the practical means of securing better nutrition and requests the Council:

“ (1) To invite the Health Organisation of the League of Nations to continue and extend its work on nutrition in relation to public health;

“ (2) To instruct the technical organisations of the League of Nations in consultation with the International Labour Office and the International Institute of Agriculture, to collect, summarise and publish information on the measures taken in all countries for securing improved nutrition and,

“ (3) To appoint a Committee, including agricultural, economic and health experts, instructed to submit a general report on the whole question, in its health and economic aspects, to the next Assembly, after taking into consideration, *inter alia*, the progress of the work carried out in accordance with paragraphs (1) and (2) above.”

* * *

At the same time, the International Labour Office, which had been informed of the general plan of the Burnet-Aykroyd report, had given proof of its interest in the report. The Mixed Advisory Agricultural Committee (which ensures liaison between the International Labour Office and the International Agricultural Institute of Rome), the International Committee for Inter-co-operative Relations (which is a private organisation for liaison between agricultural and consumers' co-operatives, under the chairmanship of the Director of the International Labour Office), had expressed their desire to co-operate in studying the question of the nutrition of workers. When the nineteenth International Labour Conference was held in June 1935, its attention was drawn to the problems of nutrition in the report by the Director of the International Labour Office, and by statements by Sir Frederick

Stewart, Miss Paterson and Miss Grace Abbot (Government delegates of Australia, New Zealand and the United States of America. The following resolution was unanimously adopted:

“ Seeing that nutrition adequate both in quantity and in quality is essential to the health and well-being of the workers and their families;

“ And seeing that, in various countries, evidence has been brought forward to show that large numbers of persons both in town and country are not sufficiently or suitably nourished:

“ Seeing, moreover, that an increase in the consumption of agricultural foodstuffs would help to raise standards of life and relieve the existing depression in agriculture:

“ The Conference welcomes the attention drawn by the Director in his report to the problem of nutrition and requests the Governing Body to instruct the Office to continue its investigation of the problem, particularly in its social aspects, in collaboration with the Health and Economic Organisations of the League of Nations, the International Institute of Agriculture and other bodies capable of contributing to its solution, with a view to presenting a report on the subject to the 1936 session of the Conference.”

* * *

At its twenty-second session (October 1935), the Health Committee considered the report by Drs. Burnet and Aykroyd and specifically discussed the hygienic aspects of the problem. It was decided that members of the Committee should forward and recommend the report to their national administrations. After having stressed the necessity for educating medical practitioners, public health workers and the public in the field of nutrition, the Health Committee adopted the following resolution:

“ The Health Committee,

“ Being of opinion that these studies may be a useful contribution to public health progress, and would be the logical development of its former activities in this field:

“ Requests the Bureau to constitute an expert committee of twelve members at most, with the following terms of office:

“ (1) To consider the suggestions contained in the Health Organisation's report, or formulated when this report was examined by the Health Committee and during the Assembly discussions on the matter (document A.61.1935);

“ (2) To select such questions of practical importance as might usefully be studied internationally and to classify them by order of priority;

“ (3) To submit a first report to the Co-ordination Committee set up in accordance with the third paragraph of the Assembly resolution of September 25th, 1935. This report would be the basis for the work to be carried out in co-operation by the technical organisations and international institutions mentioned in the above resolution.”

* * *

In accordance with this resolution, a list of questions for investigation, arranged in order of priority, was drawn up on the basis of the report for submission to the Technical Commission.

The discussions of the Assembly and of the Health Committee made it appear that health experts were to be asked to take the first step by defining the nutritional needs of the human being in the course of its development from conception to the adult age —*i.e.*, the physiological basis for adequate nutrition. It would then be the duty of the Health Organisation and of the other technical organisations, to consider the appropriate means for their practical application.

The Technical Commission appointed by the Health Committee is composed as follows:

Austria.

Professor A. DURIG, Professor of Physiology at Vienna University.

United Kingdom.

Professor E. P. CATHCART, Professor of Physiology, Glasgow University;

Professor E. MELLANBY, Secretary-General of the Medical Research Council, Professor of Physiology at the Royal Institution, London;

Sir John Boyd ORR, Director of the Imperial Bureau of Animal Nutrition, Rowett Institute, Aberdeen.

France.

M. J. ALQUIER, Secrétaire général de l'Institut scientifique d'hygiène alimentaire, Directeur de l'Institut national agronomique, Paris;

Professor André MAYER, Professor of Physiological Chemistry at the Collège de France;

Professor L. LAPICQUE, Professor of Physiology at the University of Paris, Faculté des sciences, Sorbonne, Paris.

Italy.

Professor Filippo BOTTAZZI, Member of the Royal Academy of Italy, Professor at the University of Naples.

Scandinavian States.

Professor A. HÖJER, General Director of Health Services, Stockholm;

Professor C. SCHIÖTZ, Professor of Hygiene at the University of Oslo;

Professor L. S. FRIDERICIA, Professor of Hygiene at the University of Copenhagen.

Union of Soviet Socialist Republics.

Professor B. SBARSKY, Director of the Central Nutrition Institute, Moscow.

United States of America.

Professor E. V. McCOLLUM, Professor of Biochemistry, Johns Hopkins University, Baltimore;

Dr. Mary SWARTZ ROSE, Department of Nutrition, Columbia University, New York;

Dr. W. SEBRELL, Chief of the Department of Nutrition, National Institute of Hygiene, Washington, D.C.

* * *

Dr. Harriette CHICK, Lister Institute, London, Technical Secretary of the International Conference on the Standardisation of Vitamins, was invited to take part in the Commission's work.

The Technical Commission held its first meeting in London from November 25th to 29th, 1935. Professor Edward MELLANBY was elected Chairman. The outcome of its discussions was the report known as the London Report (C.H.1197, December 6th, 1935).

As contemplated in the third paragraph of the Health Committee's resolution (mentioned on page 7), the report was communicated to the Mixed Committee for the Study of the Problem of Nutrition, appointed by the Council of the League (under the third paragraph of the Assembly resolution of September 25th, 1935, see above, page 6).

At the first session of the Mixed Committee, Professor MELLANBY and Professor McCOLLUM, delegates of the Technical Commission of the Health Committee, commented on the report. As regards nutrition and public health, the report served as a basis for the discussions of the first two sessions of the Mixed Committee (February 10th to 16th and June 4th to 7th, 1936) and for the chapter on "Nutrition and Public Health" in the preliminary report drawn up by the Mixed Committee for the next Assembly of the League of Nations.

Furthermore, since the report will have to be applied in different countries and to be adapted to varying geographical, economic and social conditions, the Commission communicated it for study to representative learned societies and social studies institutions in different countries, with a view to procuring through them the advice of specialists and administrators interested in the various

aspects of nutrition—internal medicine, public health and social medicine, pediatrics, school hygiene, etc.

These institutions are of three kinds:

I. Academies of Medicine, Academies of Science and Scientific Commissions:

<i>Belgium :</i>	Royal Academy of Medicine.
<i>United Kingdom :</i>	Medical Research Council.
<i>France :</i>	Academy of Medicine.
<i>Italy :</i>	National Research Council.
<i>Netherlands :</i>	Academy of Science.
<i>Spain :</i>	Madrid Academy of Medicine.
<i>U.S.S.R. :</i>	Scientific Research Council.
<i>United States of America :</i>	National Academy of Science.

2. Commissions whose competence covers nutritional problems:

<i>United Kingdom :</i>	Advisory Committee on Nutrition, responsible to the Ministry of Health and the Secretary of State for Scotland.
<i>Denmark :</i>	Advisory Committee on Nutrition.
<i>Norway :</i>	Norwegian Committee on Nutrition.

3. National Councils specially set up for the study of nutritional problems and for co-operation with the League of Nations:

<i>France :</i>	National Committee for the Study of the Problem of Nutrition.
<i>Sweden :</i>	Royal Committee on Nutrition.

Some of these institutions have set up commissions and sub-commissions, each with its own rapporteur, and have divided the problems recommended for further study among them, according to the relative importance of such problems within the national sphere and to the work already undertaken by the Health Services and national laboratories.

The report was also communicated to the health administrations of all countries, who were informed at the same time of the place and importance of the report in the general scheme of the work undertaken by the League of Nations to improve nutrition, as well as of the studies recommended to the national institutions.

The report was submitted to the Health Committee (twenty-third session, April-May 1936) and to the Council (May 1936) of the League of Nations. In its report to the Council, the Health Committee expressed the opinion that the Mellanby Commission

should meet again to take note of the conditions in which the report could be applied in the different countries and to take the necessary steps to continue the studies. Among the new problems recommended for consideration, it mentioned the following as of special importance for the continuation of the studies: (a) assessment of the nutritional state particularly in children; (b) nutritive food requirements during the first year of life. It felt that these two questions should be examined by experts (school medical inspectors, pediatricists, etc.), and it requested the Director of the Health Section to arrange for a consultation on each of these points.

Through information communicated in the academies and published in their bulletins, through direct contact with the various institutions mentioned and with many members of public health services, through numerous articles in medical reviews as well as in the general Press, the Commission has received much evidence of the importance universally attached to the London report and of the desire that the Commission's work should be pursued. The main idea underlying the report, the expression of the new science of nutrition, in regard to protective foods and supplementary energy-yielding foods, special requirements during maternity and growth, and the adoption, not of the indispensable minimum, but of the optimum diet as the standard now held to be necessary has met with general approval.

The various reports contained observations either on certain details, or on matters of doctrine. The latter are as follows:

(1) *The basic caloric allowance*: The 2,400 calories per day for adults not engaged in manual work with supplements reckoned per hour according to the type of work;

(2) The *coefficients* for calculating calories and proteins according to age and sex, particularly as regards maternity (pregnant and nursing women), infancy, growth;

(3) Special requirements during *puberty*;

(4) The question of official control of fish-liver oils and vitamin preparations.

The observations communicated were examined at the Technical Commission's second session, held at Geneva from June 4th to 8th,

1936 under Professor Mellanby's chairmanship. The following attended (see pages 8 and 9): Professor E. P. CATHCART, Miss Harriette CHICK, Professor L. S. FRIDERICIA, Professor A. HÖJER, Professor L. LAPICQUE, Professor André MAYER, Professor E. V. MCCOLLUM, Sir John BOYD ORR, Professor B. SBARSKY, Dr. W. SEBRELL and Dr. M. SWARTZ ROSE.

While maintaining and confirming its fundamental principles, which were unanimously approved, the Commission examined all the observations most carefully.

It believes that all were discussed and even answered. A certain number ceased to be relevant by reason of the Commission's findings on fundamental points.

One question of primary importance concerning milk was added to the problems recommended for further study.

The outcome of the work is the second edition of the London report, printed below.

This document was communicated to the meeting of the Bureau of the Health Committee held at Moscow on June 22nd, 1936, and was transmitted to the Mixed Committee, which added it to the documentary material submitted to the Assembly.

It was sent, like the first report, to the health administrations and scientific and technical institutions, academies, commissions and national councils mentioned on page 10.

The next session of the Technical Commission will be held at the beginning of 1937, when studies of these national institutions and laboratories carried out in accordance with the programme recommended in the report, will be examined.

The London report, revised and amplified as provided for at the Commission's first session, constitutes the technical basis for the work to be undertaken or pursued in co-operation by the technical organisations of the League of Nations and the other international institutions mentioned in the Assembly resolution.

PART I.

ENERGY, PROTEIN AND FAT REQUIREMENTS.

All the figures on which the Commission has agreed are average values and it is essential that they should be interpreted in the light of this fact.

1. Calorie Requirements.

(a) An adult, male or female, living an ordinary everyday life in a temperate climate and not engaged in manual work is taken as the basis on which the needs of other age-groups are reckoned. An allowance of 2,400 calories net¹ per day is considered adequate to meet the requirements of such an individual.

(b) The following supplements for muscular activity should be added to the basic requirements in (a):²

Light work:	up to	75 calories per hour of work.
Moderate work:	„	75-150 „ „
Hard work:	„	150-300 „ „
Very hard work:	„	300 calories and upwards per hour of work.

(c) The energy requirements for other ages and for mothers can be obtained from the following table of coefficients:

Age (years)	Coefficient	Calories
1-2	0.35	840
2-3	0.42	1,000
3-5	0.5	1,200
5-7	0.6	1,440

¹ The term "net calories" refers to the amount of energy available from the food actually assimilated.

² For statistical purposes, to be comparable with previously adopted standards, 600 calories may be taken as an average supplement for muscular work.

Age (years)	Coefficient	Calories
7-9	0.7	1,680
9-11	0.8	1,920
11-12	0.9	2,160
12-15 ¹	1.0	2,400
15 and upwards	1.0	2,400

The muscular activities characteristic of every healthy child and adolescent necessitate additions to the basic requirements shown in (c). It is suggested that the activities of children of both sexes from 5-11 years be considered as equivalent to light work, of boys from 11-15 years as moderate work and of girls from 11-15 upwards as light work.

Women:	Coefficient	Calories
Pregnant	1.0	2,400
Nursing	1.25	3,000

Allowance must also be made for women engaged in household duties, whether pregnant or not; these have to be reckoned as equivalent to light work for eight hours daily.

The requirements for babies under 1 year are difficult to specify except in terms of body-weight; the following allowances are considered adequate:

Age (months)	Calories per kilogramme of body-weight
0-6	100
6-12	90

2. Protein Requirements.

In practice, the protein intake for all adults should not fall below 1 gramme of protein per kilogramme of body-weight.

¹ The needs of puberty are covered by giving the child of 12-15 years a calorie allowance corresponding to a coefficient of 1, with appropriate supplements for muscular activity and a protein allowance of 2.5 grammes per kilogramme of body-weight.

The protein should be derived from a variety of sources, and it is desirable that a part of the protein should be of animal origin.

During growth, pregnancy and lactation, some animal protein is essential, and in the growing period it should form a large proportion of the total protein.

The following allowances of total protein are recommended:

Age (years)	Grammes per kilogramme of body-weight
1-3	3.5
3-5	3.0
5-12	2.5
12-15 ¹	2.5 ¹
15-17	2.0
17-21	1.5
21 and upwards	1.0

Women:

Pregnant — 0-3 months	1.0
4-9 months	1.5
Nursing	2.0

3. Fat Requirements.

Fat must be a constituent of the normal diet, but the data at present available do not suffice to permit a precise statement of the quantity required. The high content of vitamins A and/or D in certain fats justifies their use in liberal amounts.

4. The Influence of Climate on Dietary Requirements.

In cold climates, the energy-content of the diet may need to be increased. Where climatic conditions or social customs do not permit of exposure to sunshine, vitamin D should be supplied in the diet.

¹ See footnote 1, page 14.

PART II.

MINERAL AND VITAMIN REQUIREMENTS.

5. The Commission recognises the fact that the deficiencies of modern diets are usually in the protective foods (foods rich in minerals and vitamins) rather than in more strictly energy-bearing foods (rich in calories).

The term protective food denotes a foodstuff which is especially rich in those nutrient principles, "good" protein, vitamins or minerals, in which the principal foods of any geographic area are deficient.

Thus—e.g., in the United States of America, where the chief constituents of the daily diet are usually white bread and other foods made from white flour—sugar and muscle meats, milk and the leafy vegetables form the most important protective foods.

In other regions where the protein content of the diet is either too low or of poor quality (e.g., Asiatic diets consisting chiefly of polished rice or soja bean, with a small quota of green vegetables), meat would provide a highly valuable protective food.

In yet other areas where the diet consists almost exclusively of cooked or dry foods, fresh fruits and/or vegetables might be the most important protective food.

Among the protective foods are, first and most important, milk and milk products (including butter), eggs and glandular tissues; then green-leaf vegetables, fruit, fat, fish and meat (muscle). Among the energy-bearing foods of little or no protective power are sugar, milled cereals and certain fats.

Of energy-giving foods, unmilled cereals are not rich in protective nutrients and the more they are refined the less is their protective power. Many fats, especially when refined, possess little or no protective constituents. Refined sugar is of value only as a source of energy; it is entirely devoid of minerals and vitamins.

The increasing habit in certain countries of large sugar consumption tends to lessen the amount of protective foods in the diet and is to be regarded with concern.

In cases where energy values are equal, protective foods should always be preferred.

6. Requirements of Pregnancy and Lactation.

The Commission has attempted to define the quantitative needs of protective foods for perfect nutrition in terms of the requirements for the pregnant and nursing woman. She should be regarded as the member of the population needing the greatest "protection" in order to ensure adequate physical endowment for the child at birth and optimum nutrition during infancy.

The greatest difficulty in arranging such a diet is to provide adequate calcium, phosphorus, iron and vitamins B₁, B₂, C and D.

7. Milk, whole or skimmed, is a rich source of calcium salts and phosphates and of vitamin B₂, also a good source of vitamin B₁; milk fat is an excellent source of vitamin A. Eggs contain vitamins A, B₁, B₂ and D and are rich in iron. The proteins of milk and eggs are not only themselves of the highest nutritive value, but also improve the utilisation of the protein contained in cereals and vegetables. Milk has an additional advantage in that the abundance and availability of its calcium salts and phosphates enhance the effect of any vitamin D derived from other articles of diet or from sunshine. Milk, although itself poor in iron, renders more effective the iron contained in the diet.

8. Ordinary diets are usually inadequate in vitamin D and, except in sunny seasons and sunny countries, a small daily ration of cod-liver oil or other fish-liver oil rich in vitamin D is to be recommended in the diet of the pregnant and nursing mother and in that of the growing child. Fish-liver oils are also the richest known natural sources of vitamin A and are important sources

of iodine. In goitrous regions, where sea-fish are not available, the provision of extra iodine in the form of iodised salt or in some other way is recommended.

9. An extended dietary use of the potato is recommended to replace part of the sugar and highly milled cereals in the ordinary diet. Potatoes provide extra vitamin C and more readily available calcium and phosphorus than are present in cereals. Potatoes also yield more iron and B vitamins than milled cereals.

The above paragraph applies to countries where potatoes are abundant, but it is of general application, due account being taken of local resources.

10. Requirements of Other Adults and Children.

In Tables I-VI, some simple schedules have been prepared to show how a selection of common protective foods will ensure safe intakes of the necessary protein, minerals and vitamins for a pregnant and nursing woman and for infants and children of ages up to 14 years. These are based on investigations made in the United Kingdom, the United States and Scandinavian countries, and are put forward to indicate how the dietary principles set forth in this report could be put into practice where these foods are available. In every locality, it will be necessary to discover the selection of food materials which is best adapted to national dietary habits and resources, and at the same time conforms to the needs of pregnancy, lactation and growth.

No attempt is made to lay down a detailed dietary programme, or to suggest the wide choice of protective and energy-yielding foods, whose selection will be influenced by availability, appetite and economic cost. Attention should, however, be directed to the value of the lightly milled cereals as a further source of iron and vitamin B₁, and of butter in preference to other common fats, because of its rich content of vitamin A.

The protective foods in Table I are arranged to yield approximately 1,400 calories without inclusion of cereals, fats or sugar ;

these can be added as required to satisfy the energy requirements of any individual. For adults other than the pregnant and nursing woman, the amount of protective foods might be reduced, if necessary, for economic reasons. For growing children, however, the maintenance of a high proportion of protective foods should be the aim.

In Tables II-VI, schedules are drawn up on the above basis for age-groups 0-1, 1-2, 2-3, 3-5, 5-7 and 12-14 years. Since the rate of growth of a child decreases with advancing age, it will be noted that the amounts of protective foods are not greatly increased for the older groups.

11. General Recommendations.

A. Although a simplified diet may be so constituted from a few protective foods as to be satisfactory, it is a general principle that variety in diet tends to safety, provided it contains a sufficiency of the protective types of food materials.

B. White flour in the process of milling is deprived of important nutritive elements. Its use should be decreased and partial substitution by lightly milled cereals and especially by potatoes is recommended. The consumption of an excessive amount of sugar is to be condemned, as it tends to lessen the proportion of protective foods.

C. Milk should form a conspicuous element of the diet at all ages. The Commission commends the tendency manifested in some countries to increase the daily intake up to one litre per day for pregnant and nursing women, as well as to provide an abundant supply for infants, children of all ages and adolescents. The practice of providing milk either free or at a reduced price to these groups is highly recommended.

The ration of milk indicated in Tables I-VI provides from 100-75 % of the total calories during the first years of life, decreasing to about 50% at 3-5 years and to about 25% at the age

of puberty. For the older groups, some portion of the milk or meat may be replaced by cheese.

The Commission desires to draw attention to the high nutritive value of skimmed and separated milk, which, although deprived of its vitamin A through removal of the fat, retains the protein, the B and C vitamins, the calcium and other mineral elements. The Commission deplores the large wastage in many countries of this valuable food.

D. Fresh vegetables and/or fruit should always be constituents of the normal mixed diet. Adequate provision of the vitamins other than vitamin D can be readily accomplished by inclusion in the diet of optimum amounts of protective foods.

E. The Commission emphasises the need for provision of extra vitamin D, wherever and whenever sunshine is not abundant, especially in the period of growth and during pregnancy. Where the appropriate rich foods are not available, only such vitamin preparations as are officially controlled and approved should be permitted. The indiscriminate use of irradiated foods, except in the case of milk, is deprecated.

12. Problems recommended for Further Study.

- A. Assessment of the nutritional state of children.
- B. Nutritive food requirements during the first year of life.
- C. Minimum vitamin and mineral requirements.
- D. Minimum fat requirements.
- E. The nutritive and "supplementary" values of the different protein-containing foods, to determine to what extent and in what forms animal protein is necessary for growth and health.
- F. The relative nutritive value of different cereals according to the degree of milling.

- G. The extent to which the increasing consumption of sugar is detrimental to health.
 - H. Influence of climate on food requirements.
 - I. The extent to which diets in common use fall below the standards recommended in this report.
 - J. The optimum amounts of milk required at different ages.
-

TABLE
DIETARY SCHEME FOR THE

A. Protective Foods.

Food	Amount	Protein	Calcium	Phosphorus	Iron	Iodine
	Grammes				Milligrammes	
MILK	1,000	32	1.2	0.9	2.4	0.02-0.05
MEAT (or fish or poultry) .	120(a)	22	—	0.3	$\frac{5.0}{2(a)}$	—
EGGS (one)	50	6	—	0.1	1.5	—
CHEESE (c)	30	8	0.3	0.2	0.4	—
Green and Leafy VEGETABLES	100(d)	1	0.1	—	1.2	—
POTATOES	250	6	—	0.2	2.0	—
LEGUMES, Dried	10(e)	2	—	—	0.2	—
COD-LIVER OIL	3.5	—	—	—	—	Richest source
An available source of Vitamin C (from raw fruits and vegetables)						
Total yield		77	1.6	1.7	10.2	Adequate

B. Supplementary energy-yielding foods by means of which the individual's

CEREALS as needed:						
Highly milled	250(f)	28	—	0.2	2.5	
or						
Whole grain	250(g)	—	0.1	0.9	9.0	
FATS as needed.						
SUGAR as needed.						

¹ The estimates are based on data in SHERMAN'S "Chemistry of Food and Nutrition", fat. The figures for vitamins, however, are converted to international units and must be

PREGNANT AND NURSING WOMAN.

Vitamin A	Vitamin B ₁	Vitamin B ₂	Vitamin C	Vitamin D	Calories	Remarks
International Units			International Units			
Rich (1,000-3,000)	Good (50-75)	Rich	Poor	Poor	660	(a) Calculations for lean meat.
Poor	Poor (b)	Rich	Poor	None	240	(a ₁) One-half calculated as available iron.
Rich (1,000-1,300)	Good (about 15)	Rich	None	25-40	70	(b) Except glands (liver and kidneys) and pork muscle.
Rich (800-1,000)	Poor	Good	Poor	Poor	125	(c) Calculated as cheddar cheese.
Rich (1,000-1,500)	Good	Good	Poor	None	30	(d) Estimated on basis of $\frac{1}{3}$ cabbage, $\frac{1}{3}$ lettuce, $\frac{1}{3}$ spinach.
Poor	Good	Good	Good	None	250	
Poor	Good	Good	None	None	35	(e) Calculated as beans.
Rich (1,800-3,500)	None	None	None	Rich (about 300)	30	
			To yield 250-500			
Over 5,000	Over 150	Adequate	Over 500	About 300	1,440	

energy requirements can be met.

	Rich (about 250)				1,000	(f) Calculated as white flour.
					1,000	(g) Calculated as whole wheat.

4th edition, 1933. The figures for milk are calculated for a content of 3.2% protein and 3.5% regarded as rough approximation only.

Infants 0 to 1 year.

Breast-feeding is strongly recommended during the first 8-9 months of life. Even when the mother's diet and condition of life are suited for satisfactory lactation, the infant should receive supplements of (i) fresh fruit and/or vegetable juice to provide antiscorbutic vitamin C and (ii) whenever abundant sunshine is not available, a small daily ration of cod-liver oil of good quality, increasing gradually to 6 grammes daily, to provide vitamin D.

Artificial feeding. When breast-feeding is not possible, the basis of the infant's diet should be milk supplemented by an adequate amount of substances rich in vitamins A, C and D. In cases where only partial breast-feeding is practicable, the supplementary diet should consist of milk and other suitable protective foods. Milk should always be pasteurised or raised to the boil to obviate the risk of milk-borne infections.

Prevention of anæmia. The infant's reserves of iron salts being small and usually exhausted before the sixth month and milk being deficient in this essential dietary element, the addition to the diet of all infants of small amounts of foods rich in iron is advocated from an early age. Foods recommended are egg yolk, if tolerated by the infant, or purées of green vegetables or carrots; in special cases, direct administration of iron salts may be ordered by the physician.

Premature infants, whether breast-fed or artificially fed, have even greater need than normal infants for supplementary vitamin and mineral additions to the diet. These should be begun in the first days after birth. Artificial vitamin D concentrates should only be given under medical supervision, in order to avoid the risk of over-dosage.

Cereals. The practice of giving cereal foods before the age of 6 months is not advised; after this age, the use of potatoes, suitably prepared, is advocated, as a partial or complete substitute for cereals.

Fat. Milk containing 3-3.5 % fat is recommended as most generally suited for infant feeding, since large amounts of fat tend to interfere with digestion and to cause fat intolerance.

TABLE II.

Children, age 1-2 years (840 calories).

Food	Amount (grammes)	Calories	Protein (grammes)
A. Protective Foods.			
MILK	750	490	24
1 EGG (or equivalent, as 30 gram- mes meat or fish or liver, if available)	48	70	6
Green leafy VEGETABLES	30-60	15	—
POTATO (or CARROT)	30	30	—
COD-LIVER OIL	3	30	—
		<hr/>	<hr/>
		635	30
B. Supplementary Energy-yielding Foods.			
FATS (butter, if possible).	7	50	—
CEREALS (calculated as bread).	50	150	7
		<hr/>	<hr/>
Total		835	37

TABLE III.

Children, age 2-3 years (1,000 calories).

Food	Amount (grammes)	Calories	Protein (grammes)
A. Protective Foods.			
MILK	1,000	660	32
1 EGG (or equivalent, as 30 grammes meat or fish or liver, if available)	48	70	6
Green leafy VEGETABLES	30-60	15	—
POTATO (and other root vege- tables)	50	50	1
COD-LIVER OIL	3	30	—
A source of vitamin C (raw vege- table or fruit).			
		<hr/>	<hr/>
		825	39
B. Supplementary Energy-yielding Foods.			
FATS (butter, if possible).	10	75	—
CEREALS (calculated as bread)	50	150	7
		<hr/>	<hr/>
Total		1,050	46

TABLE IV.
Children, age 3-5 years (1,200 to 1,300 calories).

Food	Amount (grammes)	Calories	Protein (grammes)
A. Protective Foods.			
MILK	1,000	660	32
1 EGG (or equivalent, as 30 grammes meat or fish or liver, if available)	48	70	6
Green leafy VEGETABLES	60-100	20	2
POTATO (and other root vege- tables)	100	100	2
COD-LIVER OIL	3	30	—
A source of vitamin C (raw vege- table or fruit).			
		<hr/>	<hr/>
		880	42
B. Supplementary Energy-yielding Foods.			
FAT (butter, if possible)	15	110	—
CEREALS (calculated as bread)	75	225	11
		<hr/>	<hr/>
Total		1,215	53

TABLE V.
Children, age 5-7 years (1,400 calories).

Food	Amount (grammes)	Calories	Protein (grammes)
A. Protective Foods.			
MILK	1,000	660	32
EGG	48	70	6
MEAT, FISH, LIVER or CHEESE.	30	40	6
Green leafy VEGETABLES	100	30	3
POTATO (and other root vege- tables)	150	150	3
COD-LIVER OIL	3	30	—
A source of vitamin C (raw vege- table or fruit).			
		<hr/>	<hr/>
		980	50
B. Supplementary Energy-yielding Foods.			
FATS (butter, if possible)	20	150	—
CEREALS (calculated as bread)	100	300	14
		<hr/>	<hr/>
Total		1,430	64

TABLE VI.

Children, age 12-14 years (2,600 calories (girls),
3,200 calories (boys)).

Food	Amount (grammes)	Calories	Protein (grammes)
A. Protective Foods.			
MILK	1,000	660	32
1 EGG	48	70	6
MEAT or FISH or LIVER or CHEESE	90	120	18
Green leafy VEGETABLES	250	75	7
POTATO (and other root vege- tables)	300	300	6
COD-LIVER OIL	3	30	—
A source of Vitamin C (raw vegetable or fruit).			
		1,255	69

B. Supplementary Energy-yielding Foods.

FATS (butter, if possible), cereals and other foods to furnish total
calories as required.

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VOLUME III

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NUTRITION IN VARIOUS COUNTRIES.

POST-WAR DEVELOPMENTS IN THE FIELD OF NUTRITION.

GENERAL OBSERVATIONS.

In order to throw light on the state of popular nutrition in its economic aspect, the Secretariat has endeavoured to bring together some information on variations which have occurred in the consumption of foodstuffs in a number of countries.

Taking a general view of countries like the United Kingdom, France, Switzerland, Belgium and the Netherlands, the question of general food shortage is not a matter for anxiety. Thanks to their wealth and their highly developed communications and widespread facilities for distribution, these countries are not exposed to the danger of scarcity. It is true that, among industrial or agricultural workers who have been particularly hard hit by unemployment or trade depression, large numbers may be underfed as the result of lack of purchasing power, in spite of the considerable efforts made to assist them. For the great majority of the population, however, the nutrition problem—though at first a problem of income—is in the main a problem of quality, balance of diet, hygiene and education.

If in these countries the dietary is bad, it is due less to any deficiency of diet than to the fact that it is ill-balanced and incomplete, containing, perhaps, an excessive proportion of certain substances, while at the same time deficient in important constituents. Very appreciable progress seems nevertheless to have been made, in spite of the limitations imposed since the war by economic difficulties, and it would be valuable to be able to show to what extent these current changes in consumption are in the direction of more rational nutrition.

In other countries, the necessity for providing means of subsistence for distressed sections of the population or for whole areas of the country is the primary purpose of endeavour. Where widespread poverty and distress have resulted from the destruction of trade and the loss of employment which the economic crisis brought about, the question is not one of establishing an ideal nutrition, but of securing sufficiency. The same is often true in more backward countries.

Evidence both from advanced and from less prosperous communities will be found among the particulars which follow.

Union of South Africa.

The Health Department of the South African Government employs a field staff of medical officers and health inspectors continuously engaged in investigating health conditions in various parts of the country.

Their reports deal with health matters in general, including conditions of nutrition. Certain of the local authorities also employ full-time medical officers of health. From the reports of these officers, the Union Health Department is able to keep itself reasonably well informed of the prevailing level of nutrition in various areas and sections of the community.

In addition to the reports furnished by officers of health, special investigations into nutrition conditions have been made at various times. Chief among these may be mentioned the investigation of the Carnegie Commission carried out in 1930-31 into the Poor White Problem in South Africa. Volume IV of the report of that Commission deals with the physical condition of the poor white and is concerned very largely with the nutrition of these people. Of the two million Europeans in the Union, approximately 300,000 were found to fall into the classification "poor whites", and practically without exception all of these were found to be definitely malnourished. These "poor whites" belong very largely to the rural agricultural class.

Of the 6 million Bantus in the Union, very useful information is obtained from the condition on recruitment for the gold-mining industry. The natives go to the mines for a contract period of nine months and then return to the native reserves. There is, therefore, a large labour turnover. Of the adult male natives presenting themselves to the recruiting agencies in the reserves, more than half are rejected as physically unfit for work on the mines chiefly for reasons of malnutrition.

Of those taken on, most arrive on the mines in an under-nourished condition. The mines appreciate this fact and deliberately allow them a period of rest with unlimited food to bring them into a condition in which they can safely be put on to hard work underground. This malnourished condition of the natives in the reserves must be attributed very largely to the almost exclusive maize diet. There is a great preponderance of starch with insufficient protein, fat and vitamin. The dietary standard laid down for native labourers on the gold-mines by Government regulation includes a number of foodstuffs intended to correct these deficiencies.

CHILD NUTRITION IN CAPE COLONY.

The state of child nutrition in the Cape Province as a whole is fairly satisfactory, according to investigation made by the Medical Inspector of Schools.

There are areas, however, where conditions are not good. Certain "poor white" settlements have a fairly high percentage of malnourished children, but of late years the condition has improved very much, especially in the older settled areas. Many cases also are found in some of the Karroo dorps, where extreme poverty prevents the children getting enough to eat. This state of affairs is always much aggravated during years of severe drought. There is likewise much malnutrition on some

of the diamond diggings, where want is extreme. In some fishing villages, too, especially where much salt fish is consumed, the percentage is higher than it should be, and in most areas where the ground is poor in quality and the people live on restricted and monotonous diet largely carbohydrate in character.

There had been considerable improvement in some areas, where a better and more generous diet has been introduced into indigent boarding-houses. The chief needs are more milk and dairy products generally, especially in the areas where calcium and phosphorus are deficient. In these areas, too, the eating of tinned fish, bones and all, is to be encouraged because of the calcium phosphate in these bones.

The Cape Province is supposed to be an agricultural country, but there is insufficient consumption of dairy products in far too many homes. This is due to economic reasons, and is aggravated by the high price of dairy products generally.

(Australia.)

(Territory of Papua.)

(GENERAL SURVEY.)

In the Territory of Papua, a dependency of Australia, there is a native population of about 300,000 natives and about 1,000 Europeans inhabiting some 92,000 square miles of territory. The territory in great part consists of hills and swamps. The mountains rise to heights over 13,000 feet.

For the most part, the native population still lives in villages and subsists mainly on the produce of their gardens. Apart from the work they do on the roads and as carriers for the Government, their life on the whole is very much what it must have been before the advent of Europeans. However, some pay tax varying from 10s. to £1 per year and have to contend at times with the introduction of influenza and the consequent respiratory infections which everywhere seem to follow it. In most areas, the population is undoubtedly increasing, but, in some few, the population appears to be stationary or even diminishing. From the European point of view, all the rural villages must be suffering from a deficiency of protein. From time to time, they may get kangaroo meat or an occasional pig, either wild or tame, but the amount cannot be very great. Nevertheless, for the most part, the rural natives, even if at times under weight, do not appear to be in bad physical condition. The native food comprises sago, sweet-potatoes, taro, bananas, and various roots described as yams or taitu. The coastal people are better off in view of their ability to get fish, crabs and shell-fish in varying amounts.

In the western part of the territory, much sago is eaten. Cases of beriberi occur and the occurrence of infantile beriberi is suspected.

(Mandated Territory of New Guinea.)

NUTRITION OF THE INDIGENOUS POPULATION.

Village natives live under conditions which have varied extremely slightly from those existing prior to European invasion, which, in some areas, has existed for forty or fifty years, in others only a few years, and in others where the influence of European culture has been only sufficient to curb tribal warfare.

Nutritional problems of the non-indentured portion of the population must, therefore, be considered under subheadings, which are mainly environmental. Before subdividing the study of diet from the point of view of environment, (it must be understood that the native population is largely vegetarian—the staple diet is mainly carbohydrate, whether it is kau-kau (sweet-potato), taro, sac-sac (sago), tapioc (tapioca) or pit-pit. Later introduction of coconuts in coastal areas has considerably improved the dietetic balance.)

All protein and fatty foods (other than the small amounts of these contained in the local carbohydrate diet) are considered luxuries, and are added to the staple diet when available, whether they consist of fish in the coastal regions, pigs in all regions, kapuls (squirrels), flying foxes and muruks (cassowaries) in the interior, and coconuts and galip nuts in areas in which they grow.

Many green vegetables are eaten in all parts of the territory, but the variety is so diverse in different areas that tabulation is difficult, each section of tribes having its own list of bush plants and leaves which are recognised as a necessity for addition to the local diet.

(In spite of the apparent shortage of proteins and fats, the average diet in villages is sufficient for the physical well-being of its inhabitants.) Famines are almost unknown, and only occur in mountain areas in rare times, in which droughts destroy the crops, or in river-beds, where occasional floods wash away the gardens.

(The universal prevalence of malaria, framboesia and filaria (especially malaria) has much more influence on the morbidity and (especially infant) mortality than any shortage of food. The universal occurrence of tropical ulcers may, as has been stated, be of dietetic origin, but statistical figures since 1930 show an incidence in village population of only 2.7%.)

Austria.

GENERAL OBSERVATIONS.

The Federal Ministry for Social Welfare considers that the nutrition enquiry initiated by the League of Nations should not be regarded as concerned with medical or health questions in the narrower sense of the term, but that the problem under discussion is substantially an economic one. For, if there is any question of difficulty or impossibility of obtaining food supplies when foodstuffs of every quality and in ample

quantity are available for all classes and ages of the population, the inference must be that the means for purchasing the necessary food are lacking. If, on the other hand, the supply of foodstuffs and the purchasing power are adequate, then the nourishment will also be adequate—a nourishment in keeping with current views and varying in different countries with their habits and customs.

Moreover, provided that nourishment is sufficient, an adequate supply of vitamins is in normal circumstances guaranteed, and only in abnormal circumstances is any corrective necessary. It has been indisputably proved that a freely selected mixed diet as customary in Austria contains, as a rule, all the necessary substances in quite sufficient quantity to meet the real requirements in vitamins. Valuable constituents of a complete diet, such as fruit, vegetables and black bread, are always available in the market, and anyone who has the requisite means can procure them.

These general questions have been studied by the Salzburg Provincial Administration, which considers that, in Austria, measures to improve the dietary of individual groups only would by no means solve the general problem. This problem is, in fact, so closely linked up with the economic circumstances of the State that it can even be regarded as reflecting the economic situation. The proper nutrition of the population can therefore only be expected when a State's economic situation is in perfect order, when industrial and wage-earning conditions are normal and unemployment in the State only affects the percentage which experience shows to be unavoidable even when economic conditions are absolutely normal.

Other vital conditions may be equally important. In this connection, reference may be made here to the extremely impressive reports of the Carinthian Provincial Administration, which throw a vivid light on the hardships of the life of mountain peasants from their youth up, and especially the children.

CONDITIONS IN CARINTHIA.

In this province, under the " Winter Aid " and Youth Welfare schemes, efforts have been made in recent years to help mothers and infants, schoolchildren and unemployed breadwinners, chiefly those no longer entitled to relief. The most comprehensive assistance, designed to ensure that the needy section of the population is provided, in particular, with the necessary food, is that given by the " Winter Aid " fund. Out of a total population of 407,145, 21,995 persons were brought under this scheme of assistance between October 1st, 1934, and September 30th, 1935. All these persons lacked even the bare necessities of food. For the most part, they consisted of large families of the unemployed, and persons no longer entitled to relief. These necessitous persons were, under the auspices of the Federal, provincial and communal " Winter Aid " schemes, supplied with foodstuffs, chiefly meat, also

sausages, milk and cheese, and, to a smaller extent, with money and fuel, to a total value of 997,517 schillings. Apart from this relief, orders for the issue of foodstuffs to expectant mothers and women in childbirth were also issued by the Maternity and Infant Welfare Centres of the Provincial Youth Office.

In recent years, the provincial administration in Carinthia has devoted special attention, particularly in mountain district schools, to encouraging the introduction and development of midday meals and soup-kitchens in schools. In 1933, for instance, only 35,165 out of 75,079 schoolchildren in Carinthia received a hot midday meal; of the remaining children, 22,306 had no hot midday meal, 3,601 no midday meal at all, and the other children had only an insufficient meal. The reason for such defective feeding of schoolchildren is, partly, the really serious distress prevalent among peasants in the mountains and unemployed lumbermen and, partly also, the remoteness of country schools. In 1933, only 22,985 of the above total school population of Carinthia lived near the school itself; 20,770 children had an hour's journey to and from school, 13,779 one to two hours' journey, 5,103 up to three hours, 1,436 four hours and 530 a journey of over four hours (there and back). The provincial authorities endeavoured to obviate the resultant danger to the health of the schoolchildren by issuing warm clothing and footwear to specially necessitous cases and by promoting arrangements for school meals and soup-kitchens.

In the educational year 1934-35, sixty schools in the province had feeding-schemes. Under these schemes, altogether 278,140 rations (soup, milk-dishes, milk, cocoa, etc., and one slice of bread each) were issued free to needy children.

CONDITIONS IN OTHER PROVINCES.

According to reports from the Innsbruck Municipal Health Authority, there are still many children who come to school in the morning without breakfast. In previous years, milk was served to schoolchildren during intervals between lessons, either free or for payment, at all Innsbruck schools. Since the school year 1934-35, the free supply of milk has had to be stopped almost entirely, and even the consumption of paid school milk has greatly decreased.

In the food of larger sections of the population in Styria, a general shortage of fats and albumen is noticeable, as, owing to the rise in prices, these constituents cannot always be purchased. On the other hand, the population seems to be fairly well supplied with vegetables.

There are in Styria so-called labour camps for nursing mothers where women who would otherwise be obliged to return to heavy work within a short period after childbirth are maintained for a time and are occupied on lighter tasks.

In connection with the organisation of morning meals for children, many local group-leaders and school authorities in rural communes

have complained of the difficulty of bringing the poorest of the poor children into this work. In the country, it is often impossible to tell from the children's dress or other outward signs which homes are the poorest. The greatest care had therefore to be taken not to give children the impression that some of their number are being preferentially treated. For instance, on grounds of upbringing, a cup of cocoa should not be offered to a group of quite poor children, because even the children of somewhat better-off parents in the same school receive only a plain country breakfast at home. Country children often appreciate a cup of cocoa or a roll and butter much more than their ordinary morning meal. If everyone were given cocoa or white bread with butter or cheese, the quite poor children would in many places be distinctly better off than the less needy children, who could not be admitted to its benefits. Considerations such as these are universally heeded. Thus, poor families with numerous children are frequently given vouchers for obtaining foodstuffs, by which means assistance can be offered without reacting unfavourably on their upbringing.

Belgium.

In Belgium, according to a study of consumption indices from 1897 to 1933,¹ made by M. Dupriez and M. Borboux, the consumption of wheat has declined relatively to that of the last pre-war years. This is the inevitable corollary of the increased consumption noticeable in most of the more expensive products.

Except for coffee, the demand for groceries has risen, but very unequally. The rise since 1928 has been unusually rapid. The tremendous fall in the price of colonial produce has obviously proved a great stimulus to consumption.

The consumption of exotic fruit has been going up by leaps and bounds since 1927. The development of the trade in oranges, and especially in bananas, has been extraordinary, the volume of the latter increasing sixfold in the course of a few years. This growth in the sale of exotic fruit has a considerable effect upon the nature and variety of the dietary. In the case of meat, the general trend of the indices is regular, but this general appearance conceals important changes in regard to the kind of meat consumed. The replacement of beef by pork may be noted. In 1932, however, a strong reaction set in. Cost price and sale price respectively play a considerable part in these variations.

No progress is recorded in the beverage group, which means that, allowing for the increase of the population, there has, in effect, been a fall in consumption.

To sum up, the tendency towards the diversification of the foods consumed is obvious. Groceries are highly popular, while the consumption of bread is declining.

¹ *Bulletin of the Institute of Economic Science of the Louvain University.*

As regards other foodstuffs, indices are lacking for farm produce—butter, milk, eggs—which are all home-produced, as well as for home-grown vegetables and fruit. One might wonder whether there is not a fall in the consumption of these unrecorded items. This does not appear to be the case. It is, in fact, generally held that the home consumption of eggs has definitely increased. Similarly, it would be contrary to all past experience for the sale of butter to decline in favour of margarine during a period of marked price depreciation. Finally, it is not to be supposed that, with the low price-levels at present prevailing, vegetables and fruit will be neglected, considering that vast supplies have been thrown on the market owing to the restrictions placed on foreign trade. It would appear that the consumption of potatoes has fallen sharply; but what the rising indices indicate is precisely a displacement of consumption from the commoner kinds to the more varied and comparatively expensive kinds of food.

United Kingdom.

The official attitude towards the problems of nutrition and public health in England and Wales may be illustrated from the last report which was issued by Sir George Newman as Chief Medical Officer of the Ministry of Health, reviewing the situation in 1933.

“ Starvation is not doubt extremely rare in England, yet, although the population as a whole is obviously much better nourished than in former days, there can be no doubt that many people suffer by starving the body of certain constituents of a wholesome and sufficient dietary. The evidence of this is indisputable, and can be witnessed by all men who see cases of undernourishment, of anæmia, of rickets or of dental decay. The availability and cheapness of certain articles of food is, of course, partly responsible for their wide consumption as compared with proteins, animal fat and fresh fruit and vegetables.

“ The effects of inadequate ingestion of single food constituents would depend on the rôle played by the particular food factor in the living body. The individual constituents which are most likely, so far as our knowledge goes, to be deficient in human diets in this country are protein of high biological value, calcium, iron, and the essential vitamins A and D. There is, however, good reason to believe that deficiencies are rarely single, and the manifestations of human malnutrition are generally a combination of the effects of deficiencies in two or more food factors.”

On the other hand, attention is directed to the difficulty of isolating the effects of food deficiencies from those resulting from other factors and a danger in attributing to malnutrition conditions which have their origin in composite causes :

“ The effects of industrial depression on populations fall into two broad categories—material and psychological; and, of the two,

the latter is perhaps the more serious. Lack of money, might, of course, lead to malnutrition, but so also might a lowering of parental efficiency. From their numerous studies of diet and social conditions amongst different classes extending over several years, Paton, Cathcart and their colleagues were not able to find any constant relation between family income and health; but they did find a fairly definite positive correlation between health and parental efficiency; and, since local authorities have the facilities for free distribution of food to necessitous people, it would seem that parental inefficiency may manifest itself in unwise spending of money, the choice of improper and badly cooked food, or in excessive wastage of food and other commodities, or it may be reflected in the inadequate general care and cleanliness of the children. In no respect is parental control of greater importance to the child than in the insistence on adequate and regular hours of sleep."

The problem of under-nourishment in young children is a special one which has naturally been the subject of continuous study :

" Since the early days of school medical work, more than thirty years ago, we have known of a national problem of child malnutrition, and, since 1910, of its acuteness among children below school age . . . In 1910, it was stated that ' defective nutrition stands in the forefront as the most important of all the physical defects from which school-children suffer ' . . .

" Happily, as the result of various forms of public action (including school-feeding and the provision of milk to the babies at the Child Welfare Centres), the percentage of ' malnutrition ' among entrants and elder children has fallen to a quarter or less of the earlier incidence. In 1910, London recorded 11%, which in 1933 had fallen to less than 1%. The very standard of examination for nutrition, like the standard of cleanliness, has risen beyond recognition."

On the other hand, an enquiry carried out in 1934 by the regional medical staff into the effects of unemployment upon health led to indecisive conclusions, although, in sixteen areas out of sixty-six, substantial ill-effects were reported :

" The evidence is that malnutrition is not a prominent feature, nor that it is widespread or increasing. It is chiefly reported from the most depressed area—*e.g.*, the Tyneside and other dockyard areas on the north-eastern seaboard; but even in these areas it does not appear to be a common condition effecting more than a small proportion of the adult population, whilst its almost total absence is a noteworthy and encouraging feature of the reports from South Wales. With the exception of one of the sixty-six replies, there is no indication of any increase in the prevalence of malnutrition during the past year, and the importance attaching to that one reply is qualified by the fact that the writer is not prepared to attribute the malnutrition to unemployment."

The final conclusions of the review point to steady improvement in the nutritional and other habits affecting the popular health of England and Wales :

“ The reason why the nutritional condition of the people is better than it used to be is due (a) to their more physiological living (fresh air, exercise, rest, cleanliness, clothing, common sense and sobriety), which gives them a body which functions properly and possesses and circulates a healthy and oxygenated blood, and (b) to the improvement in the variety and content of their dietary, and to the greater availability of its essential constituents. The modern organisation of transport by land and sea, which brings food promptly and regularly to our shores from all parts of the world, has modified our former insular diet, and people are becoming accustomed to the advantages of a mixed and variegated diet. Having little or no interest in doctrines and theories concerning “ proteins ”, “ calories ”, or “ vitamins ”, they prefer food which they like and which suits them, and, happily, they are learning to like the “ protective foods ” —milk, eggs, fish, fruit and fresh vegetables. Further, the purchasing power of wages increased in 1933; our food supply is becoming cheaper, more available and more varied; and official returns indicate substantially increased expenditure upon, and increased consumption of, food (including an enormously increased consumption of oranges, apples, bananas, vegetables, eggs, fish and dairy products). Thus, for more than twenty years the nutrition of the people has been steadily improving, in response to changing habits and desire, to extending commercial facilities and to economic availability.”

As noted in the foregoing survey, there has been in the United Kingdom a notable increase in the annual consumption of certain foodstuffs as compared with the years before the war. According to estimates of the Market Supply Committee for current consumption per head of population as compared with authoritative estimates for earlier years, the increase has been as follows :

Estimated Annual Consumption (in lb.) per Head in the United Kingdom.

	1909-1913	1924-1928	1934	1934 percentage of 1909-1913
Fruit	61	91	115	188
Vegetables (other than potatoes)	60	78	98	164
Butter	16	16	25	157
Eggs (in numbers) . .	104	120	152	146
Cheese	7	9	10	143
Margarine	6	12	8	133
Sugar	79	87	94	119
Meat	135	134	143	106
Potatoes	208	194	210	101
Wheat flour	211	198	197	93

It will be observed that the increase is most marked in relation to some of the "protective" foodstuffs, whereas wheat flour, meat and potatoes are comparatively stationary. In several cases, the advance recorded in the last decade is remarkable. On the other hand, while it is difficult to give strictly comparable figures for milk consumption, the evidence suggests that there has been, as compared with pre-war years, a slight falling-off in the consumption per head of liquid milk and rapid growth in the consumption of condensed milk, leaving the aggregate unchanged. The average consumption of milk per head is estimated as half a pint per day or under. Butter consumption has expanded fast.

Bulgaria.

Like most countries, Bulgaria has been hard hit by the general economic depression and by the crisis in agricultural production in particular. But, apart from the fact that any economic crisis, by reducing the income of the individual, exercises an unfavourable effect on the dietary of a nation, other causes independent of the present crisis make it impossible for the masses in Bulgaria to obtain a rational and adequate dietary, either from the point of view both of quality or from that of nutritive value. The following are the principal of these causes :

- (1) Ignorance of the Bulgarian population as a whole as to the importance of nutrition from the standpoint of health and working capacity ;
- (2) The large number of religious fast days, when by tradition the Bulgarian people have a very plain diet containing practically no fats or albumins ;
- (3) The unequal distribution of crops in the various parts of the country, which makes it necessary for the inhabitants of the non-fertile mountain regions to pursue forms of agriculture from which they obtain only products of inferior quality and quantity.

As the result of enquiries and researches carried out by the Hygiene and Chemistry Institutes of the Sofia Medical Faculty and by the Services of the Public Health Directorate, the dietary of the Bulgarian people, and particularly of the rural population, was found to be inadequate and defective. This faulty nutrition has a deplorable effect on the working capacity of the people and on their health, particularly in the case of children.

Czechoslovakia.

THE EFFECTS OF UNEMPLOYMENT ON NUTRITION.

In Czechoslovakia, according to studies made by Dr L. Feierabend, certain fundamental changes in nutrition have been brought about by unemployment. The data relating to the nutrition of the unemployed

have nowhere been compiled in the manner which the problem demands. They only relate, indeed, to a proportion of the total number of unemployed fathers of families and cannot therefore be regarded as of general application. It may, nevertheless, be of interest to describe the changes in nutrition which have latterly been observed in Czechoslovakia. To compare the influence of unemployment on the fall in the standard of nutrition, it is necessary to consider the average for the country as a whole and see how it differs from that of the families of unemployed. From this difference it will be possible to draw conclusions regarding the losses sustained by the national economy as the result of under-consumption.

The observations carried out by the Social Institute of the Czechoslovak Republic may be taken as a basis. Unfortunately, the data collected relate to a relatively small number of unemployed families and the observations only relate to a period of four consecutive weeks (February). This period has been used as the basis of an estimate for a period of fifty-two weeks.

Where reference is made to consumption among the unemployed, this means among families assisted by the State's measures of food distribution. The consumption of families has also been traced in connection with the length of the period of unemployment and consumption in families subsidised in other ways. It is more convenient for the purposes of this enquiry to use data relating only to the consumption of unemployed families in receipt of food vouchers, as this is the most general form of relief and that enjoyed by the majority of the unemployed, and to limit the enquiry to the articles most widely consumed.

Losses through Under-consumption on the part of 554,000 Unemployed in 1932 and 738,000 Unemployed in 1933.

	1934 Czechoslovak crowns	1933 Czechoslovak crowns
Under-consumption of :		
Beef	27,962,000	34,433,000
Pork	20,951,000	26,077,000
Pork fat	33,810,000	41,695,000
Sugar	7,284,000	9,805,000
Wheaten flour	6,608,000	22,125,000
Beer	4,586,000	7,612,000
Total	111,201,000	141,747,000

The above figures of the losses sustained by the national economy are based on the number of fathers of families. We should not be far wrong in estimating the losses caused by under-consumption on the part of *all* the unemployed in Czechoslovakia in 1932, reckoning each family as consisting, on an average, of four members, at approximately

445 million Czechoslovak crowns, and in 1933 at 564 million Czechoslovak crowns.

The national economic loss is in reality much greater. In so far as beer and sugar are concerned, the reduced consumption of coal and other adjuncts to manufacture and incidental expenses must also be taken into consideration. The unemployed, however, have reduced their consumption, not merely of the above-mentioned commodities, but also of all other commodities, as is shown by the following table :

Annual Consumption of the Families observed.

		During employment in 1931	During unemployment in 1932	+ or - percentage
Beef	kg.	11.31	5.72	— 49.4
Pork	„	10.66	6.89	— 35.4
Veal	„	1.82	—	— 100.0
Mutton	„	0.91	0.52	— 42.9
Smoked meat	„	2.99	2.34	— 21.7
Horse-flesh	„	0.39	0.52	+ 79.3
Poultry	„	2.21	—	— 100.0
Game	„	1.17	1.04	— 11.1
Porkbutchers' wares	„	8.58	6.50	— 24.2
Pork fat	„	11.31	5.89	— 47.1
Butter	„	4.03	3.12	— 22.6
Lard	„	0.52	1.56	+ 300.0
Bacon	„	0.78	0.26	— 66.7
Artificial fats	„	4.81	5.85	+ 21.6
Milk	litres	178.23	170.82	— 4.2
Eggs	number	146.64	99.97	— 31.8
Flour	kg.	67.47	52.91	— 21.6
Flour pastes	„	0.39	—	— 100.0
Bread	„	109.33	113.49	+ 3.8
Confectionery	„	15.34	7.41	— 51.7
Meal	„	4.42	5.07	+ 14.7
Rice	„	5.85	5.33	— 8.9
Potatoes	„	147.68	181.61	+ 23.0
Leguminous vegetables	„	3.51	3.38	— 3.7
Stewed prunes	„	2.73	0.52	— 80.9
Sugar	„	29.12	11.83	— 59.4
Roasted coffee	„	0.52	0.52	—
Malted coffee	„	5.33	4.03	— 24.4
Chicory	„	2.25	2.21	— 1.8
Salt	„	4.16	7.41	+ 78.1
Beer	litres	44.20	11.31	— 74.4
Wine	„	0.26	—	— 100.0
Rum	„	0.65	0.65	—
Other beverages	„	0.26	0.26	—

According to the above table, there has been an increase in consumption among the unemployed of the following articles: horse-meat, lard, artificial fats, salt, potatoes and, to a slight extent, meal. The consumption of bread has increased almost imperceptibly. The consumption of all other articles of food has decreased, more particularly wine, poultry, stewed prunes, beer, bacon, sugar, confectionery, etc. Under-consumption decreases all possibility of further production and also reduces the chance of renewed employment. It is under-consumption which is the root cause of the continued depression. To break the vicious circle, two possibilities are open: increase consumption and thus promote the employment of labour, or else increase employment and thus stimulate consumption, and, as consumption increases, bring a greater and greater number of the unemployed into the process of production. These two methods have been employed in all countries. The grants made to the unemployed increase consumption, but they have no other economic effects; new wealth is not created. The other method—that is to say, the increase of employment by so-called productive relief—is much more profitable, as, at the same time, new wealth is created through the construction of buildings, streets and roads, the improvement of waterways, etc. In the majority of cases, the unemployed are paid a wage in return for their labour. This practice does not, however, guarantee that consumption will increase to the desired extent. To remedy this state of affairs even partially, a proportion of the wages might possibly be paid in kind (foodstuffs). The advantage of such a proceeding would be that the necessary foodstuffs could be bought in large quantities at lower prices and that the grants in kind might thus be increased in quantity.

Sub-Carpathian Russia.

Special attention has been devoted to nutrition problems in Sub-Carpathian Russia, which is chiefly agricultural, but is still being developed on primitive lines.

There is overproduction of meat, wine and fruit, but a serious shortage of farinaceous products; and, even with a normal harvest, as much as 4,000 wagon-loads of cereals have to be imported. Maize, the traditional and almost exclusive diet of the population, is the chief farinaceous product. It covers more than half of the arable soil in Sub-Carpathian Russia.

The question has been under consideration for some years of replacing part at least of the maize consumption by other native cereals. Much propaganda is carried on to popularise rye and nutritive bread; it will be some time, however, before this meets with success. The people in the uplands prefer maize, one reason being that maize meslin, which is used to make porridge (polenta, tokan), leaves no waste and can be ground as required in small quantities by hand. Barley, on the contrary, has to be ground in large quantities at the mill, often situated at a distance, and is used only for breadmaking.

Special attention is being devoted to the question of replacing maize to some extent by barley which, after being converted into groats might be substituted in various forms for maize meslin, in making porridge. The results, however, have not been very satisfactory.

By reason of its limited financial resources, the population of Sub-Carpathian Russia, 90% of which consists of farmers, is reduced to purchasing products of the soil and cereals; for the people have only their cottages, a little grazing-land and a few domestic animals. For the rest, they are obliged to earn their living by forestry and other occupations. That is why special nutrition measures have been instituted in the country during the last few years. The object is to supply the population with the maize which they require, at reasonable prices, within reach of all, these prices being officially fixed and uniform throughout the country, whatever the distance. These measures, organised by the competent authorities, have proved satisfactory. Persons unable to earn their living and without other sources of income are given what maize they require free of charge.

Finland.

The Finnish people have won a worldwide reputation through their successes in the field of sport, but their powers of endurance in the toil of daily life are no less celebrated. The general physical standard must therefore be regarded as very high. None the less, especially among the poorer classes, there is a good deal of physical debility as well as defects and social diseases which are directly or indirectly responsible for a considerable reduction of efficiency.

One of the most serious difficulties encountered in Finland is under-nourishment among the poorer classes. There are, for example, a considerable number of pregnant women who do not receive sufficient food or a diet suited to their condition. Moreover, especially in industry, where women are being more and more freely employed, under-nourishment makes them less able to produce healthy children; indeed, many such women die prematurely. Infant mortality, too, is still very high in Finland owing to defective nutrition. It has also been shown that the prevalent dental diseases are mainly due to dietetic deficiencies. A great many children, again, are neither adequately nor suitably fed, with the result that such diseases as rickets, which has disastrous effects, not only on the child's physical condition, but also on his mental powers, and tuberculosis in its various forms, anæmia and diseases of the digestive organs, are widespread. A continually increasing amount is being spent by the Government, the communes, and the children's parents on the prevention and treatment of these diseases—not to mention the consequent waste of labour and educational expenses.

One of the results of these nutritional deficiencies is that, directly or indirectly, some 21% of the young men who present themselves at

army recruiting offices have to be rejected. Many students also have to break off their studies or pursue them less vigorously.

All these circumstances involve a considerable waste of vital force in a small nation, quite apart from the fact that those who are fit to work have to spend an unnecessarily large proportion of their earnings on keeping and feeding those who are unfit to work or unable fully to earn their living.

The primary cause of this position in regard to the nutrition of the greater part of the people is that the diet is not suitable in its constituents, and is not adjusted to differences in age, health, occupation and natural conditions. The great majority of the people still belong to a class earning very low wages, so that for financial reasons they have to be satisfied with a diet which is insufficient in quantity and often too monotonous.

France.

PRINCIPAL FOODSTUFFS.

As far as may be judged from the statistics, which are very incomplete, it would appear that the people of France are consuming less bread and cereal foods and less meat than formerly. On the other hand, they are consuming more milk products, butter and cheese, fresh vegetables and fruit, and even more fresh fish.

It is a fact generally accepted on the strength of data available from the past that, at the end of the nineteenth century, the average Frenchman consumed about 250 kilogrammes of *bread* per year; from the investigations carried out in 1934 by the Société scientifique d'hygiène alimentaire et d'alimentation rationnelle, it would appear that, in Paris, the average *per capita* consumption scarcely exceeds 120 kilogrammes of bread each year. It may be assumed that the quantity of bread consumed by the rural population is greater; nevertheless, the decline in the general consumption of bread has been so marked that it may be regarded as having fallen by at least 25% since the beginning of the century.

During the second half of the last century, the consumption of *meat* had very greatly increased. According to the estimates of the Office national de renseignements agricoles, it amounted, round about 1860, to 1,200,000 tons, and to more than 2,000,000 tons round about 1910, or averages of 26 and 50 kilogrammes respectively per head of population, half of those quantities consisting of beef.

Since the war, meat consumption has varied considerably. After the end of the war, there was a marked increase in the consumption of butcher's meat in the country districts, whereas, in the cities, consumption appeared to be on the decline. Taken as a whole, therefore, consumption was more or less stable. There would, however, appear

to have been a slight increase since 1933, bringing consumption up to the level of the years 1927 and 1928.

Generally speaking, consumption of meat does not appear to have decreased as the result of the depression. Taking advantage of the fall in retail prices, the urban consumer has not only maintained but increased his consumption, which is greater than in the years of prosperity.

On the basis of the statistics compiled by the Association générale des producteurs de viande, the *Bulletin de la Confédération nationale du commerce et des industries de l'alimentation* (April 1935) gives the following table :

	Beef	Mutton	Total, including horse-flesh (Thousands of tons)	Pork
1934	888	96	1,032	383
1933	866	106	1,024	360
1932	794	107	950	372
1931	777	106	939	376
1930	858	110	1,023	334
1929	917	109	1,077	314
1928	908	114	1,064	310
1927	849	114	1,003	296

As, however, the population of France has increased by approximately two millions since 1913, the consumption of meat may be regarded as having slightly decreased in the last twenty years—a fact which would, to some extent, explain the disequilibrium between supply and demand on the national market.

The consumption of fresh *fish* shows marked progress, although fish is of only secondary importance in the diet of a great part of the people of France.

The increase in the consumption of fish must be due to improved means of communication and improved organisation of the fishing industry. The amount of French and foreign fish supplied to consumers in France in 1913 was estimated at 230 million kilogrammes. In 1934, despite a decline in imports and an increase of 25% in exports, the corresponding figure was 313 million kilogrammes, which represents an increase of 36% in twenty years.

The consumption of fish could be still further increased; the average consumption per head per annum is no more than 7 kilogrammes, or 135 grammes per week. Furthermore, this average is only reached through the inclusion of certain large towns and coastal regions; at Rouen, for example, according to M. Altazin, President of the Fédération nationale des commerçants en poisson, the average consumption is 41.5 kilogrammes; at Nantes, 30 kilogrammes; at Paris (where the quantities received at the *halles* rose from 52 million kilogrammes in 1913 to 62 millions in 1930), 15 kilogrammes.

Appreciable progress may be observed in the consumption of *milk products*.

In 1913, the amount of French-produced milk supplied to consumers did not exceed 128 million hectolitres; in 1934, according to the estimates of the Confédération générale des producteurs de lait, it must have risen to 150 million hectolitres. During that period, the amount of milk for consumption as such increased by 4 million hectolitres, that of milk for butter-making by 7 million hectolitres, and that of milk for cheese-making by 6 million hectolitres.

According to M. Dupont d'Isigny, the *per capita* consumption of butter in France rose from 3 kilogrammes in 1913 to 5.16 kilogrammes in 1931. Even assuming a fall in consumption as a result of the depression, progress as compared with the pre-war period would still be very marked.

It is important to note that, in France, the consumption of margarine and similar products has always been very low, scarcely exceeding an average of 200,000 quintals, as compared with 2 million quintals of butter. The question of margarine has given rise to a great deal of very interesting controversy, into the details of which, however, it is impossible to enter. So far, margarine has escaped the thunders of Parliament, because it uses up almost the whole of the nation's edible suet, so that the prohibition of margarine would have a very serious effect upon live-stock prices.

Cheese production would also appear to be on the increase. In 1934, that industry used 24 million hectolitres of milk, as against 20 millions in 1931, 18.6 millions in 1928 and 17.5 millions a few years earlier.

With its consumption averages of 80 litres of milk per head per year, 5 kilogrammes of butter and 6 kilogrammes of cheese, France no doubt remains very far behind certain other European countries.¹ These figures, however, indicate remarkable progress in a relatively short time. The consumption of milk and butter might, nevertheless, be still further increased without much difficulty.

¹ Compare the figures published by the Federation of the Netherlands Milk Industry showing consumption per head per annum in the following fifteen countries during 1935 :

	Litres of milk per day	Kilogrammes of butter per annum	Kilogrammes of cheese per annum
France	0.22	4.9	6.1
Germany	0.41	7.9	4.7
England	0.24	10.7	4.3
Australia	0.22	12.7	1.8
Austria	0.57	2.8	1.5
Belgium	0.26	11.0	3.0
Canada	0.66	13.8	1.5
Denmark	0.72	9.6	5.9
United States	0.60—0.80	8.1	2.0
Finland	1.40	9.5	1.4
Italy	0.13	1.2	5.5
Norway	0.63	6.0	4.8
Netherlands	0.30—0.40	5.7	7.2
Sweden	0.80	7.2	5.5
Switzerland	0.60—1.00	6.2	10.4

It must be noted that 400,000 pots of yoghourt—which was scarcely known in France twenty years ago—are supplied in Paris each day, and consumption is constantly increasing. “Champagne-milk” (full-cream milk aerated with carbonic acid, with a small percentage of fruit juice added) is now available for those who do not like ordinary milk, and was consumed in immense quantities during the course of last summer.

The consumption of *fresh fruit* has developed very rapidly. Ten years ago, the amount of table grapes consumed was only about 750,000 quintals; in 1929, it had already risen above a million quintals; while in 1934, which was an exceptional year, production exceeded 2,100,000 quintals. It may be assumed that the amount consumed in 1935 exceeded 1.5 million quintals, which would mean that, during the last ten years, consumption has doubled.

As regards other fresh fruit, pre-war consumption would appear to have fluctuated between 3 and 4 million quintals. In 1935, it is believed to have exceeded 10 million quintals, which figure is approximately the average for the years 1930 to 1935.

Much more fruit is being eaten. According to the Confédération nationale des industries d'alimentation, the consumption of fresh fruit in France has increased by more than a third, as compared with the period before the war. As regards Mediterranean and colonial citrus fruits, consumption has more than doubled, while there has been an enormous increase in the case of bananas and other exotic fruits. The consumption of fruit per head of population was estimated at 31.5 kilogrammes for 1933, and 38.3 kilogrammes for 1934, whereas the pre-war average was only 20 to 25 kilogrammes. Thus, the French figures now almost approximate to the English figures, which were 40 kilogrammes for 1933, and 43 kilogrammes for 1934.

The quantities of fruit and vegetables received at the Paris *halles*, which in 1913 amounted to 303 million kilogrammes, are now double that amount—630 millions in 1929 and 677 millions in 1930.

The increase in the consumption of fruit is unquestionably due to new food habits encouraged by the medical profession, but it is also to be attributed to the importation of constantly increasing quantities of colonial fruits, and more particularly citrus fruits. The quantities of fresh fruit imported into France rose from 2 million quintals in 1913 to 6 million in 1935, of which citrus fruits accounted for 1,228,000 and 3 million quintals respectively. In general, the statistical material points to the conclusion that the consumption of fresh table fruit has increased two and a half times in the last twenty years.

As regards the consumption of fresh green *vegetables*, early vegetables and potatoes, reliable data is not available. Consumption would appear to have remained at its former level. Greater quantities of French beans appear to be eaten; above all, there has been a very great increase in the variety of vegetables consumed. In most parts of the country, tomatoes used only to be cultivated by professional gardeners; the

peasant was content with potatoes, cabbages, carrots and lettuce. France now imports 40 million francs' worth of endives from Belgium, and there has been a phenomenal extension in the cultivation of this vegetable in the north of France. The varieties of canned vegetables are now much more numerous.

Since 1804, when Nicolas Appert, a humble cook in the Rue des Lombards in Paris, introduced a new process of preserving food by heat, the *preserving* industry has made enormous strides in France. At the present day, approximately 30,000 million cans of preserved foodstuffs are consumed annually in all parts of the world.

To give an idea of the quantities of tomatoes preserved, it is enough to say that, in France alone, approximately 100 million kilogrammes are canned each year. A single automatic canning-machine seals from two to three thousand cans per hour. There are days when some factories handle 200,000 kilogrammes of fresh tomatoes.

As regards green peas, a single machine is capable of shelling as much as 5,000 kilogrammes per hour without crushing or damaging the peas.

Preserved fruits also play a highly important part in nutrition.

VARIETY AND IMPROVEMENT : CHANGING HABITS.

From the foregoing facts, it may be concluded that, in the space of little more than a generation, appreciable changes have taken place in the diet of a large part of the population of France. The changes which we have noted point to better and more rational nutrition.

It cannot be denied that the dietary of the masses of the people is much more varied than before the war. There is abundant proof of this. In 1913, the catalogues of the railway stores departments consisted of one page; they now consist of twenty-five pages and include articles the prices of which customers formerly thought prohibitive. Perusal of the books of these departments before the war and to-day lead to the same general conclusions in regard to the food consumption of railway workers as those drawn from other available statistics and observations.

The Ministerial Decree of September 1st, 1853, regarding the feeding of secondary-school pupils, which is still in force, stipulated that "boiled beef shall not be served for lunch more than three times a week"; if any head of a school to-day allowed boiled beef to be served three times a week it would be certain to give rise to criticism and unpleasantness. *Pot-au-feu* (roughly, hot-pot) has completely fallen from favour, as has *ragoût* (stew); according to the administrative rules issued in 1934, the latter are to be "exceptional" in *lycées*.

Foreign women settling in Paris are struck by the important part played by beefsteak or chops in the diet of workers and their families. They express surprise at the speed with which Parisian women get their cooking done. This is a very far-reaching social change. More particularly the woman, whether she is engaged outside the home in

remunerative employment—which is frequently the case—or whether she prefers to devote herself to other occupations, spends as little time as possible in the kitchen. Slow cooking has given way to quick, “accelerated” cooking, consisting of hastily prepared roasts or grills. There has been lively controversy in the last few years regarding the “inferior cuts”, the discarding of which raises the price of meat.

It is a fact that it is the better and dearer cuts of meat which are sought after. People prefer eating less provided that the quality is better. The preparation of a *pot-au-feu*, a *ragoût*, a *blanquette*, or a dish with an elaborate sauce, takes hours and requires supervision, seasoning and the addition of vegetables requiring long preparation. Current preference cannot, however, change the fact that a carcass provides—in addition to meat for roasting—a high proportion of inferior cuts for which there is no demand, and which have therefore to be sold at insufficiently remunerative prices. The loss is made up by the higher price of steak: “beefsteak has to be sold at a higher price to bring in the money the butcher has lost through the failure of the demand for stewing-meat”.

Senator Beaumont, President of the Senate Committee on Stock-Breeding, lays great stress on this “stupidity” of the consumer; out of 200 kilogrammes of beef, there are approximately 3 kilogrammes of fillet steak. Everyone wishes to buy fillet at 30 francs a kilogramme, whereas stewing meat costs only 1 franc: “in this way, large quantities of excellent meat become unsaleable”.

The National Meat Committee notes that “tons of good meat from the inferior cuts are sold off at low prices to canning firms”. The lard has to be disposed of for industrial use.

In the same connection, the *Bulletin de la Confédération nationale des commerces et des industries de l'alimentation* (September 1935) draws attention (on page 18) to the changing tastes of customers in the matter of porkbutchers' wares. There is an increasing demand for pork from which the fat has been removed and for lean ham. Yet, whether wanted or not, there will always be a great deal of fat in pork. Since the purchaser will no longer take the fat cuts, the price of the latter falls, and the price of those cuts which are in demand shows a corresponding rise. As a result, ham, which can be consumed without further preparation, is relatively dear.

Similarly, cod is despised, its place being taken by haddock. Canned lobster, which was formerly a great luxury, is becoming more and more popular.

There is a growing desire for *hors-d'œuvre* and dessert, a taste which has become much more widespread through the growth of the restaurant habit. At school, children no longer eat a piece of bread with a stick of chocolate to help it down; as a rule, they bring bread and butter with jam. There has been an upward trend in all respects. This is a matter of imitation, a social development which has been made possible by the extension and improvement of means of transport.

That which is true of nutrition is also true of clothing. The corduroy trousers which used to be the rule among railway workers have now almost entirely disappeared. The vogue of silk stockings is well known.

The same tendency is even more apparent in the matter of housing, which is of capital importance to nutrition. There is an all-too-sweeping generalisation : “ The workman either eats or drinks ”. If he does not drink too much, he eats more and is more exacting in regard to his food. Now there is less drinking than before the war ; on this, employers and employees are all in absolute agreement. People are drinking less, and therefore eating better food—much better than before the war.

Ordinary wine is drunk to a less extent ; similarly, less beer is being drunk. The consumption of beer in France has shown a marked falling off. From 18,300,000 hectolitres in 1930, it fell to 16,700,000 hectolitres in 1934, and to approximately 15,500,000 hectolitres in 1935.¹ The miners of the north have forsaken the enormous flagons of beer, which they were in the habit of drinking on leaving the mine. Less beer is being drunk ; above all, fewer *apéritifs* and alcoholic drinks.

The cause of this general decline is in the main to be found in the fact that less time is spent in public-houses ; the working-classes visit these establishments less frequently, and, above all, do not remain there as long.

This is a result of the spread of the cinema, where drinking is not allowed ; and also of the development of open-air sports and games. Another cause is the development of the wireless, which hire-purchase systems make particularly attractive and which keeps the worker at home. At the same time, homes have become more comfortable and less gloomy. Certain workmen's suburbs, which used to look like barracks (or even prisons), look to-day, more particularly in the north of France, like small holiday resorts, with neat cottages standing in their own gardens.

From the point of view of the nutrition of the working-classes, the importance of environment cannot be exaggerated. The proper environment is a separate family home, a cheerful dwelling, where the woman can attend to her housekeeping, with gas in the kitchen and washing facilities, where the man can read, amuse himself and while away his time, and where the children can do their homework. The only alternative is the public-house, with porkbutchers' wares for food, which, though very dear, are very convenient.

¹ In France, the consumption of wine in 1934 was 68 million hectolitres ; the consumption of cider, 7 millions.

In 1934, the consumption of beer in the following countries was :

	Millions of hectolitres
United States	50.0
Germany	36.8
England	25.4
France	16.7
Belgium	13.8
World total	185.0

Thirty years ago, there were many railway labourers at St. Denis who drew a daily wage of 5 francs ; they paid 50 centimes for a bed, and in winter, when it was dark at 5 o'clock, they used to drink absinthe until dinner and bedtime ; their normal allowance would be six absinthes at 30 centimes each. The lodging-house keeper used to contrive to put off supper as long as possible, by which time they had scarcely any further interest in it.

Lodging-houses of the very worst type abounded—always with a bar, through which it was necessary to pass. Nowadays, they are not so numerous. Even the *bistro* (cheap café or public-house) has changed. The days of the “ Assommoir ” are over. In place of the ill-lighted zinc counter, which was until recently the rule, the *bistro* is always introducing new attractions and appearances of luxury ; well lit, well heated, smart, with imitation mahogany everywhere, his premises now cost him from 60,000 to 100,000 francs.

Our remarks have in the main been confined to conditions in Paris. It would appear, however, that, in general, they would also apply to the rest of the country, rural districts as well as towns, though allowance will have to be made for very great differences as between the various districts.

A detailed enquiry would make it possible to be more specific.

In Bresse, for example, the peasants lived fifty years ago on a kind of maize porridge and milk products ; meat was eaten only once a week. In other parts of the country, however, a great deal of meat was being eaten even before the war, as pork formed the basis of the family diet. Nowadays, in Bresse, people consume much less maize and milk products and much more meat.

The depression has even had the effect of increasing the consumption of meat among the peasants, who are unwilling to sell their stock at very low prices. Everywhere there has sprung up a highly developed system of exchange. Milk is converted into butter and cheese, which are sold. Furthermore, transport facilities make it possible to market large quantities of milk in the great centres, to which it could not formerly have been brought. Before the war, the Paris milk supplies were all obtained within a radius of 120 kilometres. To-day, milk is also obtained as far afield as Charente, Burgundy and, since the return of the Saar to Germany, Moselle. The daily consumption of the Paris market is estimated at 1,200,000 litres of milk, which is obtained from about twenty French departments.

Hungary.

The Hungarian Institute of Public Health made an investigation in 1933 covering the whole country, in order to estimate the effect of the economic crisis upon public health. The institute reached the conclusion in December 1934 that the crisis had caused a reduction in the standard of life for all, without distinction of class. Except in the

case of the unemployed, however, public health had not, in general, been markedly impaired, although certain specialised studies on the weight of new-born infants, on the growth of schoolchildren from poorer families, and on the spread of dental caries, seemed to point to a measure of decadence in the physical condition of the people.

Italy.

IMPROVEMENT IN NUTRITION.

According to the data published by the Central Statistical Institute on the calorie supplies represented by Italy's food products, the daily amount available for an average man was 2,985 calories during the pre-war period 1910 to 1914. There has been a material improvement in the last few years (in spite of the depression), the figure reached being 3,291 calories, which, again, is slightly lower than that of the four years preceding the present depression (3,350 calories per day per average man during the period 1926 to 1930).

Since the pre-war period, the weight of the products of animal origin has increased to such an extent that the increase in the available supplies for the latter period as compared with the pre-war period consists almost entirely of calories of animal origin, which have risen from 120,000 per average man per annum to 160,000. A similar improvement has taken place in the supplies of proteins, fats and carbohydrates.

Taking as basis the physiological composition of the "proper ration" determined by Bottazzi (100 grammes of proteins, 75 grammes of fatty substances, and 540 grammes of carbohydrates), the average ration at present available in Italy (108 grammes of proteins, 71 grammes of fatty minerals and 537 grammes of carbohydrates) shows only a negligible shortage of fats, which, owing to the special conditions of the climate, does not give any ground for alarm.

To conclude this first broad survey reference may be made to a few main indices showing the quantitative variations which have occurred in the last few years in the supplies of certain food products. It has been found that the supplies of wheat flour per head in 1929 to 1933 (taking 1910-1914 = 100) were 114.91; the corresponding figure for rye flour was 104.65, and those for maize flour and rice were 93.72 and 92.20 respectively. This decline is explained by the reduction in consumption of maize and rice in the agricultural districts (Piedmont, Lombardy, Venetia and Emilia), where the rural classes have changed over from a monotonous to a more varied diet with greater physiological value.

The increase in foods of animal origin observed above is confirmed by the following indices, which, compared with a basic figure of 100 for the period 1910 to 1914, show still more clearly the evolution which has taken place in Italy as regards the consumption of meat. The index for beef was 146.93, for mutton and goat's meat 127, for pork 170, and

for horsemeat 245. On the other hand, there were declines for salted and prepared meats (61.48) and for game and poultry (77.02). But these two figures, which seem to indicate a general reduction, are in reality due to the fact that the statistics of these products have declined on account of the growing tendency of the rural classes to consume these products themselves, whereas previously they had considered them as luxuries which they sold in the markets in order to obtain money to buy other goods and meet more urgent requirements (clothes, medicines, doctors' fees, etc.).

The same improvement in the standard of living of the rural classes accounts for the decline in the statistics for marketed eggs (84.30).

The same series of indices reveals the increase which has occurred in the last few years in the supplies of fresh fruit (110.53), citrous fruits (143.77) and bananas (300).

The increase in the food supplies of animal origin has been greatly assisted by the development of the fishing industry in Italy, as a result of which the index for fresh and frozen fish is 354.55. There has also been a considerable increase in the consumption of milk (112.52) and natural butter (194.92), which has been substituted on a constantly increasing scale for other fats previously in general use.

Another point to be noticed is the reduction in alcoholic beverages (index, 78.20 for wine, 85.78 for beer and 78.38 for alcohol), showing the good effects of the "Dopolavoro" organisation, which, by encouraging workers to spend their hours of leisure in sports grounds and places of instructive and educational recreation, has largely contributed to a reduction in the consumption of these beverages in public premises, while developing their consumption in the family, which in the past had been too often disturbed and poisoned by the alcoholism of one of its members.

After this general survey, let us see the results of this evolution of food conditions in Italy, as revealed by certain indirect indications.

The death rate clearly shows the contribution made by improved nutrition to the gradual and considerable decline in deaths which has occurred in the last few years. As compared with an average of 19 deaths per 1,000 inhabitants during the five years 1910 to 1914, the figures for the Fascist era are as follows: 1922, 18; 1923, 17; 1924, 17.1; 1925, 17.1; 1926, 17.2; 1927, 16; 1928, 16; 1929, 16.5; 1930, 14.1; 1931, 14.7; 1932, 14.7; 1933, 13.6; 1934, 10.1.

These beneficial results shown by the figures for the last few years are confirmed by the progressive reduction in infant mortality during the first year of life, which is often due to a defect in the mother's nutrition. In 1927, deaths during the first year of life were 120 per 1,000 live births; in 1928, 120; in 1929, 125; in 1930, 106; in 1931, 113; in 1932, 110; in 1933, 100; and, in 1934, 95.

These results of the better conditions of living in general and of better nutrition in particular will be appreciated at their true value when it is considered that the increase in food supplies available for the national

community is largely due to agricultural labour and technique, which, with unshakable faith and determination, have obtained and will increasingly obtain from the soil of Italy all the vital energy which it can supply to feed its numerous and laborious population. This is not mere rhetoric, as is shown by the following series of indices regarding the total agricultural production of Italy. Taking the production of 1922 as 100, that of 1929 was 139.3; that of 1930, 129.8; that of 1931, 123.4; that of 1932, 162.5; that of 1933, 147.9; and that of 1934, 153.

MEASURES TO PROMOTE INDEPENDENCE OF OUTSIDE SUPPLIES.

The fundamental problem of national independence of outside supplies has been faced and completely solved in the case of bread, a staple foodstuff for which Italy was previously dependent on other countries. The "Wheat Battle" which was inaugurated in 1925 has enabled the Italian people to face without anxiety the contingency of all foreign wheat supplies being cut off. The wheat harvest in Italy has increased as follows since 1920 (in thousands of quintals):

1920	38,466	1929	70,795
1924	46,306	1931	66,520
1926	65,548	1933	81,252
1927	53,291	1935	74,500

Similar action is being taken successfully—particularly in connection with the present situation—to make the country independent of foreign supplies of other foodstuffs. There is, for example, the campaign to encourage the consumption of rice, the production of which has very considerably increased in Italy, part of the crop being exported. Similarly, efforts are being made to induce the public to consume more home-grown fruit and vegetables instead of meat, which has hitherto had to be imported from abroad. The very satisfactory results obtained show the effectiveness of the methods adopted.

BY-PRODUCTS AND SUBSTITUTES.

Special attention has recently been paid to the utilisation of by-products and food substitutes, the idea being to make full use of the food value of agricultural produce and to supply the poor with cheap, wholesome food.

Thus, steps have been taken, or are shortly to be taken, for the utilisation of animal fat as seasoning, of oil from the residue of olives, of cheese mixed with animal fat and of butter from skimmed milk, etc.

The measures taken have in no case led to the disappearance or to a scarcity of the genuine or choice articles, but have merely added new products to those already in the market.

MEASURES TO ENCOURAGE THE CONSUMPTION OF CERTAIN PRODUCTS.

Even before the application of sanctions had forced Italy to encourage or discourage the consumption of certain products, efforts had been made to guide and concentrate consumption on the food products which afford Italians greater economical or biological advantages. We would mention, for instance, the campaigns to increase the consumption of fruit, vegetables, grapes, milk, dairy products, etc. Highly satisfactory results have thus been obtained through propaganda and special legislative measures (relative to transport, the operation of markets, etc.).

According to the Central Statistical Institute, the consumption of vegetables per head has risen from 32.13 to 39.21 kg. between the five years prior to the war and the five years 1928-1932—an increase of more than one-fifth; the consumption of fresh fruit (except oranges and lemons) has risen from about 4 million to 12 million quintals; the consumption of fresh grapes has, in five years, risen from 2½ to 5 million quintals.

It is therefore certain that the dietary of Italians has changed in the direction of a larger consumption of vegetables and fruit, a change which is approved by hygienists, particularly when climatic conditions are taken into consideration. This general change of habits has proved particularly valuable from the point of view of food supplies in the period of sanctions, as it has enabled the consumption of meat to be limited and a large debit item in the balance of trade to be cancelled out without any inconvenience for the Italian population.

AN EMERGENCY DIETARY.

This whole movement was developing in a spirit of co-operation and national confidence when the day came for Italy to organise her resistance to the front of sanctionist nations. In this emergency, Italy was anxious to replace or restrict the consumption of imported goods while at the same time providing the population with an appropriate and adequate diet.

During this emergency regime, progress in the direction of a steady improvement in nutrition has, of course, been checked; nevertheless, the organisation was ready to meet the difficult requirements of the situation without its being necessary to requisition foodstuffs or to introduce ration-cards. The Secretary of the Party, through his "Order Sheet", which reaches the smallest villages, having regard to the nutritional difficulties created by the sanctions, laid down the following guiding principles for a national diet dictated by circumstances :

A Standard Mixed Diet.

1. Only a mixed and varied diet provides the human organism with all the body-building and energy-giving elements which it requires. Consequently, the principal meal of the day should consist

of varied foods of vegetable origin in such quantities as can be wholly supplied by national production.

2. Carbon is needed in the daily diet, which should therefore contain mineral salts and vitamins; these elements are essential to meet the requirements of the adult organism and the organism during the period of growth.

3. Cereals (wheat, rice, maize, barley, rye) constitute the staple elements of Italian diet; they are consumed in the form of alimentary pastes, soups, "polenta", etc. They need to be supplemented, however, by other elements containing the nutritive principles which cereals lack or contain only in small quantities. The daily diet should therefore include at least one of the following elements: milk, dairy produce, eggs, meat, fish, vegetables, fruit.

The Feeding of Children.

4. Children should be given each day: (a) fresh milk (which has first been boiled—in places where there is no "milk centre") or preserved milk; (b) orange, lemon or tomato juice, in addition to the ordinary elements specially suitable to their age.

5. The diet of persons engaged in manual work should be more plentiful and contain a larger quantity of carbohydrates (bread, alimentary pastes, rice, vegetables, etc.) than that of persons leading a sedentary life.

6. In allocating each week the sum to be spent on food for the household, the following rules should be followed: cereals and vegetables, not more than 30 to 35%; foodstuffs of animal origin (meat, fish, milk, dairy produce, eggs), at least 25 to 35%; fats (bacon fat, butter, lard, margarine, oil), at least 7 to 10%; vegetables and potatoes, not more than 10 to 20%; fruit, from 14 to 16%.

7. The adoption of the continuous working time-table has made it necessary for families to change their dietary habits; if they have larger breakfast, the cold meal at midday can be smaller. The chief meal can be taken in the early hours of the evening.

Rules for a Rational Diet.

8. The following rule might be adopted for feeding a family; at each meal, milk for the children and bread for everyone; each day, cereals for all (alimentary pastes, rice, etc.), potatoes, tomatoes or oranges and lemons; one or two dishes of green or other vegetables, fruit, butter, bacon fat, lard, oil, margarine, sugar. From twice to four times a week, vegetable or tomato salad for all, dried vegetables, eggs (especially for children), meat, fish, cheese. The Commission for the Study of Nutritional Problems has prepared a few specimens of cheap bills of fare on these lines, which will shortly be distributed with the pamphlet containing the general rules for rational and economical nutrition, using home-produced foodstuffs.

These orders have been made widely known. The subject is dealt with by wireless in the form mentioned above whenever an opportunity arises. There is a special section for rural propaganda, the "Ente Radio Rurale" (Rural Radio Institution). The heads of the Syndical Organisation give wireless talks on these subjects to their comrades. The "Luce", a cinematograph organisation, informs and instructs the people on these matters and thus helps to achieve the common object.

Latvia.

PRODUCTION OF FOODSTUFFS.

Remarkable changes have taken place in the production of foodstuffs during the period 1930-1935. Until then, a large part of the foodstuffs consumed in Latvia was imported from abroad—for example, breadstuffs (rye and wheat), nearly the whole of the sugar consumed, and large quantities of eggs and salted herrings. During the years of world economic depression, the Latvian Government, chiefly owing to its desire to help the farmers, who were suffering severely from the crisis, and partly also in order to improve the balance of foreign trade, enacted a number of laws for the purpose of encouraging home production of foodstuffs and restricting the importation of these commodities. The measures taken by the Government have had the following results :

Bread-making Cereals.

Although Latvia is an agricultural country, the home-grown crops of breadstuffs did not suffice up to 1930 to cover the needs of home consumption. For many years in succession, large quantities of rye and wheat had to be imported to feed the towns (and to some extent also the country districts of Latgale). Thus, in the five harvest years from 1923-24 to 1927-28, imports of breadstuffs remained comparatively stable, varying only slightly on either side of 100,000 tons per annum, rather more than half of which was rye and the remainder wheat. During these years, foreign breadstuffs accounted for about 30% of Latvia's total cereal consumption. In 1928, the excessive humidity and the floods caused a very bad harvest in Latvia, which led to an increase in imports to 217,000 tons for the 1928-29 harvest year (the harvest year being reckoned from August 1st to July 31st following) and to 166,000 tons for 1929-30.

Beginning with the 1930-31 harvest year, the situation was completely transformed. In 1930, the harvest was a very good one. Already during the previous years, the Latvian farmers had found considerable difficulty in disposing of their crops, for which they obtained only very low prices, since the import of rye was free and the Customs duties on foreign wheat extremely low. The position of the farmers became particularly critical in 1930. Owing to the fall of prices on the world market, the price of cereals imported into Latvia also underwent a remarkable decline during that period.

In order to enable farmers to sell their cereals and obtain a satisfactory price, the Government enacted, in August 1930, "Measures for the control of the market in breadstuffs". The Government bought rye and wheat from the farmers at prices fixed by it in advance and resold the grain to the flour-mills. The same procedure was adopted during succeeding years. The result was not only an increase in the area sown (particularly with wheat), but also an improvement in the yield per hectare. The total harvest reached a volume which made importation of foreign cereals superfluous. In 1930-31, 54,000 tons were still imported, and 30,000 tons in 1931-32; but, in 1932-33, all imports of bread-making cereals ceased. For the last four years, therefore, Latvia has been self-supporting in breadstuffs.

That production has increased to such an extent that home-grown cereals not only suffice for the needs of home consumption and industry, but leave a considerable surplus for export. In the period 1923-1927, the total consumption of breadstuffs in Latvia for feeding the population, and also to some extent for sowing, fodder and industrial requirements, has reached an average of 400,000 tons per annum (rye and wheat). But the 1932 harvest produced 440,000 tons; that of 1933, 540,000 tons; that of 1934, 630,000 tons; that of 1935, 540,000 tons (364,000 tons of rye and 177,000 tons of wheat). There was, therefore, a large surplus for exportation. In 1934, Latvia exported 46,834 tons of rye and 2,379 tons of wheat, and, in 1935, 88,425 tons of rye and 65,749 tons of wheat. In a space of a few years, Latvia has been converted from an importer to an exporter of breadstuffs.

An interesting point in connection with the production of breadstuffs is the great increase in the production and consumption of wheat. Owing to an increase in the area sown and the yield per hectare, the total wheat harvest rose from 60,000 tons in 1925 to 183,000 tons in 1933, 219,000 tons in 1934 and 177,000 tons in 1935, and has therefore trebled in less than ten years. The consumption of wheat (particularly white wheat bread) has increased in relation to the total consumption of breadstuffs both in the towns and in the countryside.

The last few years have witnessed a large production of breadstuffs in Latvia. And yet the consumption of bread in the towns has not only not increased, but has even declined, while the consumption of animal products—meat and, to some extent, also dairy products—has considerably increased.

Meat.

The number of farm animals has continually increased, even during the years of depression, as is shown by the following table.

Agricultural censuses were held in Latvia in 1929 and 1935, so that the data for these years are more accurate than for the others, for which estimates have been made.

	Cattle	Milch cows (included in previous column)	Pigs	Sheep
1928.	960,600	—	535,000	1,090,400
1929.	978,400	721,200	382,200	905,500
1930.	1,026,300	728,400	522,700	872,900
1931.	1,116,900	745,200	712,100	923,100
1932.	1,153,100	784,300	581,600	984,000
1933.	1,155,800	802,900	585,900	1,114,300
1934.	1,157,600	807,100	686,400	1,208,900
1935.	1,272,200	874,600	801,800	1,345,000

The number of farm animals is now greater than before the depression. The same remark applies to sheep, the number of which was declining before the depression but which greatly increased during the years of crisis. The production of fodder has consequently been expanded. This has had the result of increasing the production of meat. The number of animals sold by farmers to feed the population of the towns and the average weight of these animals have risen, as is shown by the following figures :

Number of Animals slaughtered in the Towns, and of Animals slaughtered in the Country and sold in the Towns.

	1927-1930 Annual average	1931-1934 Annual average	1934	1935
Cattle	121,000	133,000	152,000	151,000
Calves	286,000	271,000	291,000	288,000
Pigs	188,000	287,000	315,000	345,000
Sheep	200,000	158,000	202,000	225,000

A particularly large increase is to be observed as regards pigs sold by farmers. Nearly all these pigs are consumed in the Latvian towns, for only 36,000 were exported in 1935 (barely 2,000 tons of bacon to the United Kingdom, and various small quantities elsewhere).

Latterly, animals have also been better fattened. The weight of the animals slaughtered at the municipal slaughter-houses of the city of Riga has been as follows :

	1927-1930		1931-1933		1935	
	Live weight average	Dressed carcass average	Live weight average	Dressed carcass average	Live weight average	Dressed carcass average
	Kg.	Kg.	Kg.	Kg.	Kg.	Kg.
Cattle	324	162	372	186	394	197
Calves	53	32	61	37	65	39
Pigs	119	95	133	106	139	111
Sheep	40	20	40	20	39	20

The average weight of animals slaughtered has greatly increased in the last few years.

The increase in the number of animals sold by farmers and in the average weight of the meat of these animals has been followed by an increase in the quantity of meat sold by farmers.

Meat sold by Farmers and consumed in the Towns.

	1927-1930 Annual average Tons	1931-1934 Annual average Tons	1934 Tons	1935 Tons
Beef	19,600	24,700	27,300	29,700
Veal	9,200	10,000	11,000	11,200
Pork	17,900	30,400	32,500	38,300
Mutton . . .	4,000	3,200	3,900	4,500
Total . . .	50,700	68,300	74,700	83,700

Nearly all the meat sold by the farmers has been consumed in Latvian towns. Latvia has only exported about 2,000 tons of bacon per annum during the periods in question.

As compared with the pre-depression years, the consumption of meat has increased in the towns by 50 to 60%. This is due to the extraordinary fall in meat prices.

It should also be observed that the town population has hardly increased at all in Latvia in the last few years. At the time of the 1930 general census, there were 693,000 inhabitants in the towns, and, in 1935, the figure was 710,000, making an increase of about 2%. Thus, the extraordinary increase in meat consumption in the towns in the period 1931-1935 applies, not only to the total quantity of meat consumed, but also to the quantity of meat consumed per head of the population in the towns.

During the same period, the consumption of meat also increased in the country districts. This general increase in meat consumption in the towns and country also shows that meat production has considerably grown in Latvia in the last five or six years.

Dairy Products.

In 1929-30, milk production in Latvia amounted to 1,304,000 tons (these data refer to the period May 1st-April 30th). During the next six years, the number of milch cows increased, the figure rising from 721,000 at the 1929 agricultural census to 874,000 at the 1935 census (an increase of 21%). The average yield of milk per milch-cow has also risen. Thus, while in 1929-30 the average yield of milch-cows inspected by the live-stock control companies was 2,461 litres of milk (with a fat content of 3.86%, making 94 kg. of milk fat or 108 kg. of butter), in 1933-34 the yield was 2,567 litres of milk with a fat content of 3.89% making 100 kg. of milk fat or 115 kg. of butter. Thus, the average yield of milk per cow increased by 4%, and the quantity of fat or butter contained in the milk by 6.4%.

Owing to the increase in the number of milch-cows and in the average yield per cow, it may be calculated that the quantity of milk produced in 1935 amounted to about 1,640,000 tons, with a slightly greater fat content.

In 1929, exports of Latvian butter amounted to slightly less than 15,000 tons, and, in 1935, to slightly less than 17,000 tons. In 1929, 360,000 tons of milk were used, and 410,000 tons in 1935, for the production of exported butter. The consumption of unskimmed milk in Latvia (in the form of milk, butter, cream, cheese, curds and other milk products) may therefore be estimated at about 940,000 tons in 1929, and at about 1,230,000 tons in 1935. Thus, the consumption of milk and dairy products in Latvia increased by 30% during the period 1930-1935. At the same time, the average consumption of milk and dairy products per head of the population followed the same upward curve; for, from 1930 to 1935, according to the general census, the population of the country only increased by 2.6%—from 1,900,000 to 1,950,000.

Eggs and Poultry.

According to the data of the agricultural census of 1929, the number of poultry in Latvia was as follows :

Fowls	1,853,653
Geese	59,700
Ducks	84,142
Turkeys	18,516
Total	<u>2,016,011</u>

Subsequently, a census of farmyard poultry was taken only in the 100 most representative communes (there are 517 communes altogether in Latvia). In these 100 communes, the figures obtained in 1934 were greater than those of 1929 by 63% in the case of fowls, 104% for geese, 138% for ducks and 275% for turkeys. On the assumption that the number of head of poultry followed the same course in the other communes during the years 1929-1934, the approximate number of poultry in Latvia in 1934 may be estimated as follows :

Fowls	3,000,000
Geese	120,000
Ducks	200,000
Turkeys	70,000
Total (in round figures)	<u>3,400,000</u>

The production of eggs, on the basis of the figures of the 1929-30 agricultural census, amounted during this period to 134,000,000 per annum; 131,000,000 were used to feed the population of towns and country (the remaining 3 millions being utilised for hatching). On the assumption, again, that the production of eggs increased in the same

proportion as the number of poultry, it must have been about two-thirds greater in 1934 than in 1929—*i.e.*, about 218 millions per annum. The consumption of eggs increased in Latvia to almost the same extent—*i.e.*, by 67%—for the importation of eggs, which has now ceased but which amounted in 1929-30 to 8,586 cases, or 12.4 million eggs per annum, hardly affects the figure. There have been no imports in recent years, and Latvia is now self-supporting in this respect. The export of eggs is trifling: 1,038 cases in 1933, 464 in 1934 and 1,778 in 1935.

In the years 1929-1934, the consumption of poultry increased in about the same proportion as the number of fowls and the production of eggs—*i.e.*, by about 67%. Compared with the consumption of beef, veal, pork and mutton, that of poultry is trifling. Thus, while the quantity of meat derived from domestic animals sold by farmers and consumed by the population of the towns amounts to over 80,000 tons per annum, that of poultry thus consumed does not exceed 1,000 to 1,500 tons. The farmers sell and the town population consumes about 700,000 fowls (including pullets and cockerels), 40,000 ducks, 40,000 geese and 15,000 turkeys per annum.

Fish.

Before the depression, the first place in Latvia's fish consumption was occupied by herrings. From 1925 to 1927, 16,000 tons were imported per annum. In 1930, herring imports amounted to 19,000 tons; but, in 1934, it amounted to 9,000 tons and, in 1935, to 10,000. In the last few years, the consumption of herrings has seriously declined, owing to restrictions on imports and to the fact that the price of herrings has fallen much less than that of meat, thus making them relatively dearer for the great mass of consumers.

The production of the Latvian maritime fisheries in the last few years has been as follows:

	Tons
1924-1930 (average)	10,461
1931.	9,284
1932.	10,024
1933.	13,892
1934.	11,496

In the years 1933 and 1934, the production of sea fisheries greatly increased as compared with that of the years 1931-1932 and 1924-1930. The chief fish caught was the small Baltic herring, of which the catch was 7,236 tons in 1934; next come flounders and turbot (1,904 tons in 1934), cod (806 tons), etc.

The quantity of fresh-water fish caught is estimated at 3,500 tons per annum.

Nearly all the product of the fisheries is consumed within the country. Latvia exports only small quantities of fish and tinned fish. In 1934,

for example, she exported 311 tons of fish and 635 tons of tinned fish, the figures for 1935 being 118 tons and 926 tons respectively.

In the last few years, the consumption of fish has slightly declined in Latvia, a fact due to the decrease in the consumption of herrings caused, in its turn, by the increase in the consumption of meat.

Sugar.

Before the world depression, the consumption of sugar in Latvia steadily increased, reaching an average of about 50,000 tons per annum in the years 1929 and 1930. This consumption declined during the years of depression, for, the price not having fallen, sugar had become comparatively a more expensive foodstuff. In 1934, the Sugar Monopoly sold 42,314 tons, but, in 1935, only 41,382 tons, these being the amounts of sugar consumed in Latvia.

Even in 1929-30, nearly all the sugar consumed in Latvia was imported from abroad. In the last few years, thanks to Government support, the cultivation of the sugar-beet and the sugar industry have developed to such an extent that all the sugar necessary for national consumption is produced within the country from Latvian beet. In 1935, sugar ceased to be imported; the same will be the case during the current year and in the future.

The area under sugar-beet was 14,398 hectares in 1934, and the crop was 336,000 tons of beetroot.

Fruits and Vegetables.

In 1930, the apple crop amounted to about 121,000 tons, that of pears to 5,500 tons, and that of plums to 3,500 tons. Statistical data are not available for cultivated berries (cherries, gooseberries, red currants, strawberries and raspberries) and wild berries (bilberries and cranberries). Crops of fruits and berries, moreover, vary greatly from one year to another. In 1930, for example, the crop was quite a good one. The number of fruit trees is continually increasing, which also leads to an increase in the fruit crop.

The export of fruit is trifling. The importation of fresh and dried fruits (oranges, lemons, grapes, etc.) averaged 7,000 tons in 1929-30 (in the previous years, it was much smaller owing to the higher Customs duties). In 1934, imports of fruits and berries barely exceeded 1,000 tons.

The cultivation of various vegetables is constantly increasing in Latvia. This applies chiefly to the cultivation of vegetables in greenhouses in the neighbourhood of Riga (green salad, cucumbers, lettuces, tomatoes, radishes).

The production of honey averaged 1,090 tons per annum in the period 1925-1934 and amounted to 1,416 tons in 1933 and 1,134 in 1934.

The fixed prices guaranteed to farmers for their products in proportion to the cost of production, and the stable market on which they can rely, constitute an important factor which has largely contributed to the development of the production of the principal foodstuffs in Latvia. The efforts of the farmers to recoup themselves for the losses suffered as a result of the decline in the prices of some of their products (meat, for example) have also exercised a certain influence.

CONSUMPTION OF FOODSTUFFS.

Nutrition of the Town Population.

In 1930, the towns of Latvia had 693,000 inhabitants and the country districts 1,207,000; while, in 1935, the town population amounted to 710,000 inhabitants and that of the country districts to 1,240,000.

The consumption of foodstuffs by the town population is estimated on the basis of statistical data regarding family budgets collected by the Government Statistical Office for the year 1926-27 (April to April), more recent data being lacking. The data thus collected relate to families living a steady life—*i.e.*, endeavouring to live rationally within their income. In view of the complexity of the nutrition question, the Government Statistical Office only drew up figures for the four months of January, April, July and October, which are typical of the four seasons they represent. The figure for the average monthly consumption throughout the year was obtained by taking the arithmetical mean of consumption during the four months mentioned above.

In compiling data on family budgets, public officials, school-teachers, employees of sickness insurance funds, etc., were classed as intellectual workers, while the different kinds of artisans, workers and labourers formed the group of manual workers. The manual workers whose expenditure on food was noted chiefly belonged to the category of skilled workers.

Further, the family budgets were divided into other groups—namely, city of Riga and provincial towns. The city of Riga had 377,000 inhabitants in 1930, or more than half the total number of town-dwellers in Latvia.

The families whose expenditure was noted had the following average income per unit of consumption: ¹

¹ The needs of an adult man are taken as the unit of consumption; the units are reckoned proportionately as follows:

Age	Male Sex	Female Sex
Up to 2 years	0.3	0.3
2 to 6 years	0.4	0.4
6 to 10 years	0.5	0.5
10 to 12 years	0.6	0.6
12 to 13 years	0.7	0.6
13 to 15 years	0.8	0.7
15 to 17 years	0.9	0.8
Over 17 years	1.0	0.8

	In Riga Lats	In other towns Lats
Intellectual workers . . .	132.17	110.10
Manual workers	77.84	69.19

An average household has 2½ units of consumption.

Out of the total expenditure of a family, food accounts for the following proportions :

	In Riga %	In other towns %
Intellectual workers . . .	32.3	35.6
Manual workers	48.2	43.3

At Riga, the expenses of the intellectual worker, who chooses the more costly foodstuffs, exceed those of a manual worker by 16% per calorie on an average, while in the other towns this percentage even reaches 28%. Compared with manual workers, intellectual workers consume less cereal products and more meat, fish and other produce.

In the towns, the consumption of certain foodstuffs has greatly increased in the last five years. This applies particularly to meat and dairy products, with the consequence that there has been a decline in the consumption of bread.

Nutrition in Rural Districts.

The data on this subject are less detailed than those which have been collected with regard to the nutrition of town-dwellers. In any case, the dietary of the rural population is more frugal than that of the town-dwellers. All the data regarding the dietary of the rural population have been taken from the material possessed by the rural accountancy service of the Government Statistical Office. In the rural households which keep accounts, the principal foodstuffs consumed on an average per adult ¹ during one year were as follows (these data refer to the economic year beginning on May 1st) :

Products	1929-30 Kg.	1930-31 Kg.	1931-32 Kg.	1932-33 Kg.	1933-34 Kg.	1927-1932 average Kg.
Rye	153.1	146.9	129.3	122.7	142.9	149.8
Wheat	72.3	86.3	89.7	87.6	94.2	79.1
Barley	58.0	63.7	70.8	78.2	69.0	56.3
Peas, beans, etc..	7.0	11.6	9.9	10.5	10.0	8.6
Potatoes	263.2	274.4	303.5	294.2	279.1	259.8
Full milk	218.1	306.9	305.0	339.3	380.5	302.9
Skimmed milk . . .	417.7	363.0	324.9	391.9	316.9	343.7
Butter	9.6	11.1	11.0	11.5	9.8	9.6
Pork.	48.2	57.4	71.0	62.0	59.9	55.1

¹ Children below 5 years of age are counted as 0.3 of an adult, from 5 to 10 years as 0.5, from 10 to 15, 0.8, and over 15, 1.

Products	1929-30	1930-31	1931-32	1932-33	1933-34	1927-1932 average
	Kg.	Kg.	Kg.	Kg.	Kg.	Kg.
Mutton	6.2	4.8	5.1	6.3	6.7	7.2
Beef and veal	8.0	8.8	12.9	18.4	16.4	11.4
Eggs (number)	77	75	81	94	96	69
Honey	1.4	2.0	2.1	2.0	2.2	1.5
Sugar	—	36.0	31.1	20.6	26.9	28.0
Salt	—	22.0	19.5	15.9	18.6	19.1
Herrings	—	12.4	6.6	2.5	5.9	12.6

In recent years, the consumption of wheat has considerably increased in the rural districts, owing to the extension of the cultivation of that cereal. An increase is also to be noted in the consumption of full milk and of beef and pork. The same applies to the consumption of eggs and honey in the country districts. On the other hand, a decline is to be observed in the consumption of sugar and herrings. Not being able to obtain these products, the farmer restricted his consumption of them during a time when his income and purchasing power were reduced.

INCREASE IN THE CONSUMPTION OF FOODSTUFFS, 1931-1935.

Dr. K. Ulmanis, head of the Latvian Government, has, for a long time past, been untiring in his efforts to provide a stable market for Latvian agricultural products, while also guaranteeing adequate prices corresponding to the cost of production. These ideas are described in Dr. K. Ulmanis' work entitled "How to reconstruct our Agriculture and make it more productive", which appeared as early as 1929—*i.e.*, on the eve of the world economic crisis. This work contains a carefully defined programme of agrarian policy. Subsequently, and particularly in the last two years—*i.e.*, since the National Government has been in power—this programme has been fully applied. The importation of agricultural products which can be cultivated at home completely ceased during the period 1930-1935. The Government has guaranteed fixed prices and a sure market for the following products: wheat, milk delivered at the dairies (*métairies*), bacon, linseed, sugar-beet. The Government itself buys large quantities of wheat and also the whole flax and sugar-beet crops.

As we have seen above, this activity on the part of the Government has resulted in an extraordinary increase in agricultural production.

Course of Retail Prices.

The big fall in prices during the years 1931, 1932 and 1933 proved a powerful stimulus to increased production of foodstuffs.

Average Retail Prices in Latvian Towns (in lats per kg.)

	1928	1929	1930	1931	1932	1933	1934	1935 (December)
Rye bread	0.34	0.32	0.25	0.28	0.28	0.25	0.21	0.20
White bread	0.73	0.69	0.66	0.64	0.61	0.58	0.52	0.49
Barley meal	0.53	0.49	0.39	0.36	0.33	0.31	0.29	0.26
Dried peas	0.48	0.61	0.50	0.36	0.32	0.30	0.28	0.26
Potatoes	0.14	0.15	0.08	0.07	0.05	0.05	0.04	0.04
Pork	1.75	2.21	1.89	1.10	0.79	0.96	0.93	0.80
Smoked pork	2.20	2.73	2.41	1.56	1.13	1.25	1.22	1.06
Mutton	0.95	1.25	1.31	0.94	0.61	0.61	0.61	0.54
Beef with bones (for soup)	0.95	1.19	1.23	0.91	0.50	0.48	0.50	0.48
Veal	0.79	1.01	1.01	0.68	0.46	0.46	0.48	0.49
Lard	2.57	2.87	2.49	1.85	1.52	1.60	1.57	1.34
Dead fowls (each) . . .	2.40	3.22	3.25	2.78	1.90	1.76	1.76	1.81
Full milk (per litre) . .	0.21	0.22	0.20	0.17	0.13	0.12	0.11	0.12
Curds	0.51	0.53	0.48	0.39	0.30	0.27	0.28	0.29
Sour cream	1.93	1.82	1.65	1.21	0.94	0.89	0.88	0.91
Dutch cheese	2.56	2.66	2.44	2.06	1.63	1.46	1.50	1.44
Unsalted butter	3.49	3.53	2.94	2.31	1.78	1.77	1.74	1.91
Eggs (each)	0.13	0.14	0.12	0.10	0.08	0.08	0.08	
Rye in grains (100 kg.)	29.95	25.47	17.20	20.85	22.20	20.09	15.87	13.29
Wheat in grains (100 kg.)	35.91	31.54	27.07	24.59	25.51	25.72	20.95	16.85

In the last four years, the foodstuff prices, as far as agricultural products are concerned, have for the most part fallen by 50% and even more as compared with the prices prevailing during the last years before the depression. The extraordinary fall in the prices of agricultural products led farmers to develop production, in order to recoup themselves by an increase in the quantities of products for sale. This extension of production led to a large increase in the consumption of animal products (meat) and dairy products, particularly in towns, but also in the countryside. As compared with the years 1927-1930, the consumption of meat by town-dwellers in 1934-35 showed an increase of 50 to 60% (per head). In the towns, the increase in the consumption of meat and dairy products has been encouraged by the extraordinary fall in the prices of these products, which has greatly exceeded the fall in income and wages of inhabitants in the towns. In particular, the production and supply of meat in the towns during the years of depression were so great that prices had to fall enormously to adjust themselves to the purchasing power of the town population, whose income had declined.

Course of Wages.

In the Riga industrial undertakings, the average remuneration¹ of workers in all branches was as follows :

	1930	1933	1934	1935 (December)
Skilled workers :				
Men	100	77.4	75.0	78.6
Women	100	86.4	86.4	88.6
Unskilled workers :				
Men	100	79.7	79.7	84.7
Women	100	90.9	90.9	93.9

As compared with the year 1930, the average wages² of industrial workers at Riga have declined by 6, 11, 15 and 21%, whereas the index of the cost of foodstuffs consumed by Riga workers has been as follows :

1930	100	1934	69
1931	89	1935 (December) . .	62
1932	75	1936 (January) . .	56
1933	74		

A worker's family which spent 10 lats, for example, in 1930 on a certain quantity of various products could have bought the same quantity in 1934 for 6.90 lats—*i.e.*, a reduction of 31%. In December 1935, the same quantity of products cost only 6.20 lats, or 38% less, while, in January 1936, it could be obtained for 5.60 lats, or a difference of 44% compared with 1930. Thus, in the case of foodstuffs, the cost-of-living index shows a much more rapid decline than wages. Hence, workers, like the other inhabitants of the towns, have been able to buy and consume a much greater quantity of foodstuffs than previously.

The general index of the cost of living for Riga workers (which, apart from food, includes rent, heating, lighting, clothing, etc.) has also fallen much more than their wages.

General Index of Cost of Living for Riga Workers.

1930	100	1934	72
1931	91	1935 (December) . .	69
1932	79	1936 (January) . .	66
1933	76		

Compared with the index of the cost of food, the general index of the cost of living has declined less rapidly, and the prices of clothes, rent, etc., have fallen less than those of foodstuffs.

¹ Net average wages per hour (including overtime pay and piece-work, but excluding payments to sickness and unemployment insurance funds).

² About two-thirds of the total number of Latvian industrial workers are employed in industrial undertakings at Riga.

INTERDEPENDENCE OF EXPORTS OF FOODSTUFFS AND OTHER BRANCHES
OF LATVIAN ECONOMIC LIFE.

In 1935, Latvia exported butter to the value of 18½ million lats; breadstuffs (wheat and rye), about 9 million lats; bacon, 2 million lats; other meat, half a million lats; pork, 3½ million lats; making a total of 33 million lats, representing one-third of the total Latvian exports (98.7 million lats). In addition, canned fish and confectionery are also exported.

Since 1930-31, exports of agricultural produce, formerly free, have been considerably hampered by various import restrictions introduced by certain manufacturing (and other) countries in Europe. For instance, exports of butter to Germany, which had gradually risen from nil in the first years of Latvia's independence to 15,000 tons in 1930 (worth 47 million lats), fell rapidly from 1931 onwards. The reason was the increased Customs duties on imports of butter into Germany and an even stricter system of quotas on exports of this article. In this way, exports of Latvian butter to Germany fell to 10,000 tons in 1932, 6,000 tons in 1933 and 1934, and even below 5,000 tons in 1935, or to one-third of the former level of exports. Latvia's economic situation was further greatly affected by the extraordinary fall in butter prices. In 1929, Latvian butter commanded 4 lats per kg. in Germany; in 1934, only 1.20 lat; and, in 1935, 1.36 lat. Latterly, exports of Latvian butter tend to find their way to the United Kingdom, notwithstanding the extremely low prices paid there (70 centimes per kg. in 1934 and 1 lat in 1935). Since 1932, the United Kingdom has also introduced import duties on Latvian butter, so that the free import of butter to that market has been substantially hampered. A smaller quota has also been imposed in the United Kingdom on imports of Latvian bacon, which reacts unfavourably on the development of pig-breeding in Latvia. That is why exports of bacon to the United Kingdom are limited to 2,000 tons per annum.

These import restrictions on the chief Latvian exports have done serious damage to Latvian agriculture. The extraordinary fall in the prices of agricultural produce for the export market has entailed a price reduction of 50% and even more on the home market. Thus, in 1931, farmers sold their produce for 70 million lats less than in 1930, the difference being equal to almost one-third of the total income of Latvian agriculture before the depression. The fall in the purchasing power of Latvian farmers has greatly affected national industry, and trade and transport have also suffered. As a result, in 1930 and 1931, about 40,000 wage-earners, or more than 20% of all the persons earning wages before the depression, lost their employment in industry, trade and transport, while wages were simultaneously greatly reduced. The fall in taxpayers' incomes was also felt by the revenue. Farmers have fallen into debt, their total obligations amounting to 300 million lats. The prices of many agricultural products having fallen to an

extraordinarily low level, while debts and interest rates remained stationary, it became extremely difficult, not to say impossible, to settle the amounts owed.

To remedy these various difficulties, the Government has adopted the following means : export bounties on agricultural produce, facilities for farmers as regards the repayment of their debts, opening of the home market to agricultural and industrial products, and, lastly, restrictions on imports of industrial and agricultural articles.

The heaviest export bounties were paid on butter. Up to September 1st, 1935, they cost the Government about 65 million lats. Bacon exports have also been stimulated by bounties. The purchase in 1934 and 1935, at fixed prices, of the heavy crop of bread stuffs (rye and wheat) and their subsequent export at much lower prices must have entailed very heavy losses for the Government.

The Government has given farmers various facilities for payment of debts, reducing the interest rates on State loans, extending for several years the time-limits for paying the claims of the State Agricultural Bank and cancelling altogether certain classes or parts of loans given by the State. Forced sales of the property of farmers have been suspended. At the same time, a minimum quota of inalienable agricultural property has been established, so that cases of farms being sold by auction have become very rare. Furthermore, many short-term loans have been extended at a cost to the Government of 20 million lats.

Since the end of 1931, imports of industrial and agricultural products have been cut down more and more so as to enable Latvian farmers to increase their income. Of recent years, Latvia has been unable to buy abroad the same amount of industrial articles as before the depression, and has therefore had to limit imports by putting quotas on the goods in question. These import restrictions have also been necessary in order to give employment to unemployed factory workers. As a result of the fall in foreign imports and the exhaustion of stocks of foreign manufactured articles, national industry has, in fact, been able to extend its output considerably.

Much of Latvia's output of foodstuffs being exported abroad, her prosperity and the state of her finances, agriculture, industry and commerce largely depend on the volume of these exports and the prices secured. Accordingly, the level of prosperity of Latvia's population and, *eo ipso*, the improvement of her nutrition, are closely bound up with the extent of the market provided for Latvian exports in manufacturing countries and the prices paid there for her products.

Netherlands.

The consumption of fats has fallen off by 8% since 1932. Numerous families receive margarine coupons, and the use of this is widespread.

Canned and minced meat is provided for unemployed persons, and those who need it. It is, however, comparatively little used. The consumption of meat has fallen off by 50%. On the other hand, vegetables are very cheap, and the consumption is very large. The price of fish has fallen considerably, and the population has the benefit of the reduction.

Bread is still the principal foodstuff in the case of indigent persons.

Enquiries made at The Hague and Utrecht have yielded the following results : Bread which is not sold at once but is still fresh is sold at half the price for ordinary bread, with the result that it is preferred by certain sections of the public. Some 70% of the bread consumed is without milk content. The quantity of albumen is from 300 to 1,000 grammes per head per day. The larger the family, the greater the quantity of bread consumed.

The decline in the use of milk is regarded as regrettable, as diminishing the quantity of animal albumen and vitamins consumed.

Generally speaking, it may be said that nutrition has suffered to a certain extent, and that the value in calories of the food consumed has fallen off by some 4% in a number of families. But the figures are still well above the minimum level, which may be put at 2,500 calories. It may therefore be said that nutrition has not as yet suffered from this very slight falling-off. The physical condition of the population has not yet been affected, and public health does not, in general, leave anything to be desired. Contagious diseases are extremely rare, and even endemic diseases, such as scarlet fever and diphtheria, do not give ground for anxiety. The death rate from tuberculosis—though that does not constitute a reliable criterion—continues to decline. From 6.8 per 10,000 inhabitants in 1932, it fell to 6 in 1933 and to 5.4 in 1934. The total mortality of the population in recent years has fluctuated between 9 and 8.4 per 1,000.

Netherlands East Indies.

The medical officers attached to the large agricultural and other undertakings see that the diet of the workers is sufficient to keep them in physical condition. To this end, these medical officers frequently consult the Public Health Service and study the findings of scientists who have carried out researches in this field.

The Government medical service supervises the nutrition of the employees of the large and small undertakings who are supplied with food by the employers. As soon as cases of diseases such as beriberi or scurvy occur, steps are taken to improve the diet. The Government services do not merely ascertain whether the population is under-nourished, but endeavour to prevent famine by giving the people advice in regard to agriculture, stock-raising, fishing.

Curaçao.

Although the nutrition of Curaçao has never been specially studied, it may be said that the diet is for the most part irrational and inadequate. Its main defects are : (a) the insufficient use of fats ; (b) the use of bad kinds of fats ; (c) the lack of vitamins due to the inadequate consumption of fresh meat and fresh vegetables.

Generally speaking, the population dislikes vegetables, apart from certain kinds which are only available for a short season. Moreover, it is sometimes difficult to obtain fresh vegetables and fruit.

As the rainfall in the Leeward Islands is very low, the population, which is unable to obtain fruit and vegetables regularly, has become accustomed to foodstuffs which are easily procurable and can be preserved. The people therefore feed on maize flour (foencki) and salt meat or fish, and eat very little fresh meat, fresh fish or fat.

The Government is endeavouring to improve nutrition by encouraging the growing of such vegetables as the population will eat, by reducing as far as possible the price of fresh meat, milk and butter, facilitating the distribution of wholesome foodstuffs, and stimulating propaganda on behalf of rational nutrition.

The Government's efforts have already brought about an improvement.

Siam.

PREVAILING LEVEL OF NUTRITION.

The Kingdom of Siam, with a population of approximately 12,000,000, has different dietetic customs according to localities and cultures. The people that have had a higher education possess dietetic customs different from the others. The population of Northern and Eastern Siam consume foods, including rice, which are totally different from those of the people of Central and Southern Siam. Also, people living in the city or town area eat foods which are different from those consumed by the rural population.

In 1930-31, Professor Carl C. Zimmerman, Ph.D., of Harvard University, conducted a survey of the prevailing standard of nutrition of the Siamese people. This survey has shown that the rural inhabitants of Eastern and Northern Siam consumed mainly glutinous rice, while the Central and Southern peoples eat chiefly non-glutinous rice. The people consuming glutinous rice receive energy value of about 2,500 calories per day, while those whose main diet consist of non-glutinous rice receive about 2,000 calories per day. It is of interest to note, also, that people consuming non-glutinous milled white rice usually live near rivers, canals and the sea-coast and enjoy the beneficial effects from the consumption of fish and sea food.

Besides rice, which is the main food of the country, the rural population also consumes daily varying quantities of other foods, but in rather somewhat small quantities. Hardly any milk or other dairy produce

is utilised at all. The old tradition of teaching people, and particularly the young, to eat plenty of rice and only a very small quantity of protein food has played great havoc among the rural population. Although in the case of the city and town population this old tradition is slowly losing ground, protein deficiency is an urgent national problem in Siam.

Of all the vitamin deficiency diseases, beriberi causes the greatest number of deaths, and in 1935 claimed a mortality of 1,857.

Another problem arises from the fact that the city and town population consumes an over-abundance of fat in both animal and vegetable forms, while the rural population does not partake of a sufficient amount of fat. Along with the campaign to combat protein deficiency, the department will also carry out systematic propaganda to increase the consumption of fat among the rural population.

Switzerland.

The following particulars are taken from agricultural statistics and estimates published by the Swiss Peasant's Secretariat at Brugg.

CONSUMPTION OF FOODSTUFFS IN SWITZERLAND.

Annual Consumption per Head of Population.

		1911	1934
Bread cereals	kg.	134	149
Potatoes	kg.	127	98
Wine	litres	56	48
Meat	kg.	56	54.8
Eggs	number	100	158
Honey	kg.	0.6	0.8
Household milk	kg.	280	251
Cheese	kg.	11.1	8.5
Butter	kg.	5.1	7.1
Sugar	kg.	23.7	44.3
Coffee	kg.	2.8	3.4
Citrous fruits	kg.	3.4	11.0

Swiss Fat Supplies: Total Consumption (in thousands of quintals).

	1923	1931	1933	1934
Animal fats and oils ¹	347	378	388	413
Vegetable fats and oils	121	234	261	281
Total	468	612	649	694

¹ Not including the production or consumption by peasants producing their own requirements.

Total Consumption of Vegetables in 1931 (in thousands of quintals).

French beans	350	Salsify	30
Green peas	170	Common beetroot	60
Cabbage	770	Onions	215
Spinach and seakale beet	160	Rape-cole	80
Lettuce	385	Cucumbers	60
Carrots	100	Tomatoes	110
Radishes	55	Other vegetables	215
Celery	65	Total consumption	2,895
Leeks	70		

Turkey.

Turkey is primarily an agricultural country, the peasants (*i.e.*, the agriculturists) representing, according to the 1935 census, as much as 83% of the total population. The great majority of the population is therefore self-supporting in the matter of food, with the result that the food supply of the Turkish peasant may be said to be unaffected by the world crisis of over-production. The food problem in Turkey is not a consequence of over-production, but, on the contrary, is due to shortage of products.

In certain districts in Turkey, where the climatic conditions are unfavourable, production is curtailed or, on occasion, completely prevented by drought, the result of which is temporary hardship for the districts concerned.

Otherwise, the Turkish peasant has never been the victim of under-nutrition as a result of the world economic crisis; but the fall of prices as a result of over-production throughout the world has naturally had its effect on the Turkish market. The peasant has not always been able to market his produce at a satisfactory price, and this has prevented him from acquiring a number of articles on which he normally expends what money he has. The peasant's purchasing power, that is to say, has been curtailed, and the urban districts have felt the effect of this curtailment. The urban population (consisting mainly of traders, industrial workers and, above all, home workers) is comparatively hard hit, in spite of the fall in prices as a result of over-production, and is compelled, in consequence, to restrict its food and other requirements.

It cannot, however, be said that there is any food problem in Turkish cities and small towns of the kind which is found in other countries. The food problem with which the present enquiry is concerned is a consequence, generally speaking, of unemployment. The large number of unemployed and the marked reduction of their purchasing power lead, as the studies of the League of Nations Committee concerned show, to some irregularity in regard to nutrition and critical conditions

in connection with the marketing of produce. In Turkey, on the other hand, there is no question of unemployment, particularly in recent times.

Yugoslavia.

GENERAL REMARKS.

Yugoslavia is an agricultural country where industry is only just beginning to develop. Having no important industrial centres or large numbers of factory workers, she has been spared the major shocks which the depression caused in most industrial countries by forcing States to assist millions of the unemployed in order to preserve social peace. On the other hand, the difficulties experienced by the rural population of Yugoslavia are due to the low prices of agricultural produce, excessive taxation and debt. These burdens, however, do not affect the actual food of the population, except in the poorer areas : Montenegro, Herzegovina, Dalmatia, part of Bosnia and, to some extent, Croatia and Slovenia. Less importance is therefore attached to the question of popular nutrition in Yugoslavia, a mainly agricultural country, than would be attached to it in manufacturing countries. Where an acute need was felt, the question was usually solved by local action. As this work is not done systematically and is not centralised, it is, of course, difficult to gather the information relating to the subject.

THE NUTRITION PROBLEM IN DISTRICTS WHICH ARE NOT AGRICULTURALLY SELF-SUPPORTING.

According to the statistics for 1932, out of 343 districts in Yugoslavia with 14,049,738 inhabitants, there are 129 districts with 4,566,985 inhabitants in which more than 50% of peasant families have not sufficient food to await the next harvest and in which, therefore, nutrition is very inadequate. It is true that, in 1932, the wheat crop showed a heavy deficit on account of blight, a disease which is very widespread, especially in the producing districts. It cannot be said, however, that the above facts indicate an exceptional or temporary position, and it should be borne in mind that, in Yugoslavia, if the wheat harvest is inadequate, or if it fetches a high price, wheat is replaced by maize as the food of the population. Thus, while there was a shortage of wheat in the year to which these particulars relate, it was compensated by an abundant maize crop. As against a reduction in the wheat crop of 7,057,583 quintals in 1932, as compared with the average for 1930-1934, the maize crop showed a surplus of 7,556,100 quintals as compared with the average for the same period. These particulars may be taken as an approximate index of the standard of living of a considerable part of the Yugoslav peasants.

For the purpose of comparing the above particulars with the general agricultural statistics, we might divide the territory of these 129 districts

into two separate groups. In one group, comprising 46 districts with 2,042,705 inhabitants, the land would, in view of the extent and fertility of the cultivated area, suffice to feed the entire population living in them. But, on account of the impoverishment of a great part of the population and the existence of a well-to-do class in these districts, most of the inhabitants have too little land or no land at all. On the other hand, the well-to-do possess more land than they require for their vital needs. The other group comprises the districts which are not agriculturally self-supporting—that is to say, those in which the cultivable land is over-populated or too poor to feed the population living upon it. This second group consists of 83 districts with 2,524,280 inhabitants. In a country like Yugoslavia where the agricultural depression has greatly reduced the purchasing power of the rural population and thus considerably restricted its possibility of satisfying its needs on the market, the arable land is one of the principal sources of food supply. Wherever this source is inadequate, the population is necessarily placed in a very difficult position. This is the case in the districts which are not agriculturally self-supporting.

More detailed examination shows that, except for the banovine of Vardar, in which the density of the population is uniform, the districts which are not self-supporting in all the other banovines ¹ are less densely peopled than the others. But, if we compare the area of the cultivated land with the total area, the position is quite different, as will be seen from the following data :

Banovine	Area				Percentage of arable land in relation to the total area		Percentage arable land per 100 inhabitants	
	Total Hectares		Arable land Hectares		Of the districts which are not self-supporting	Of the entire banovine	Of the districts which are not self-supporting	Of the entire banovine
	Of the districts which are not self-supporting	Of the entire banovine	Of the districts which are not self-supporting	Of the entire banovine				
Drave	575,700	1,622,900	62,926	306,625	10.93	18.89	25.26	26.83
Save	885,300	3,916,000	120,827	1,218,859	13.64	31.13	32.55	44.40
Verbas	542,900	2,080,100	116,521	630,168	21.46	30.30	62.96	61.36
Primorje	1,161,500	2,005,100	135,342	249,047	11.65	12.42	27.12	27.20
Drina	869,000	2,779,100	139,716	788,883	16.07	28.39	40.77	49.50
Zeta	1,988,800	3,057,100	124,327	287,069	6.25	9.39	23.98	31.70
Morava	337,400	2,573,100	65,358	717,313	19.37	27.88	40.29	49.50
Vardar	474,100	3,738,900	94,334	858,289	19.89	22.96	47.62	53.84

It is therefore only in the non-self-supporting districts of the banovine of Verbas that the percentage of arable land per 100 inhabitants is greater than the average for the whole banovine ; on the other hand, the yield

¹ The banovine in Yugoslavia is the largest administrative unit.

is smaller. Otherwise, there is less arable land in all the districts which are not self-supporting, as compared both with the area as a whole and with the population. On comparing these districts with the banovine of the Danube, which is known as the granary of Yugoslavia and in which 66.43% of the total area is arable (in the districts which are not self-supporting, the minimum is 6.25% and the maximum 21.46%) and which contains 86.6 hectares of arable land per 100 inhabitants (in the districts which are not self-supporting, the minimum is 23.98 hectares and the maximum 62.96 hectares), it will be seen how great is the shortage of arable land in these districts.

In the districts which are not agriculturally self-supporting, the arable land is not only limited in quantity in relation to the population, but is also inadequate in quality; it is generally classified as poorer and as less fertile than in the other districts of the same banovines. Thus, the banovines of Vardar, Drave, Zeta and Primorje, taken as a whole, provide much less wheat and maize per head of the population than would be required for their food even if the entire maize crop was used for feeding the population. But, as other articles are produced to a larger extent in these banovines, with the exception of the districts which are not self-supporting, the population procures the indispensable foodstuffs by selling these articles.

In the districts which are not self-supporting, the yield of all the cereals produced is not even one kilogramme per inhabitant per day. The figures include, however, even barley and oats, which are not used for human food in the richer districts of Yugoslavia. The production of cereals in these districts, therefore, is far from sufficient for the needs of the population.

Apart from bread, there are two vegetable products which play a very important part in the food of the rural population, especially in the poorer districts of the country—*i.e.*, the potato and the cabbage.

Cabbage production is only sufficient in the districts which are not self-supporting in the banovines of Drave and Save. There is also an abundant production of potatoes in these districts as compared with the districts which are not self-supporting in the other banovines, and especially in those of Morava and Vardar, where it is definitely inadequate. On comparing the above figures with the yield of wheat and maize in the districts which are not self-supporting in the banovines of Drave and Save, it will be observed that the lack of bread is to some extent made up by potatoes.

In the banovines where the grain production is insufficient, cattle and industrial plants are of great importance; after them come wine and fruit. By selling these products, the rural population in question is enabled to purchase consumption products which its own land does not produce in sufficient quantity.

These forms of production are more developed in the richer districts than in the districts which are not self-supporting. The latter

take a greater share in the production of the following commodities : in the banovine of Verbas, plums ; in the banovine of Primorje, feverfew, wine, olives and Mediterranean fruits ; in the banovine of Drave, apples and nuts ; in the banovine of Zeta, feverfew and figs ; in the banovine of Morava, wine. But, if these figures are compared with the production of wheat, maize and potatoes in these poorer districts, it will be seen that the somewhat larger production of these articles is far from making good the low yield of substantial food products. This is strikingly evident in the districts which are not self-supporting in the banovine of Vardar, in which the production of tobacco is only one-tenth of that of the other districts, while no opium or cotton is produced. These articles, however, are of great importance for the banovine of Vardar, especially tobacco and opium.

The figures for cattle-breeding—which show that the number of almost all kinds of live-stock (except pigs) is greater in the districts which are not self-supporting than in the other districts—might lead to wrong conclusions unless we also consider the production of fodder.

It is noteworthy that, in all cases, except in the banovines of Drave and Save, the cultivation of fodder is of small importance. Without such cultivation, however, there can be no question of raising a good breed of live-stock. With the exception of the banovine of Drave and a part of the banovine of Save, in which live-stock is predominantly raised in stalls and stables, the other banovines have only mountain cattle of a poor breed, fed solely in the fields and on hay.

In poor years, both cattle and human beings suffer in these districts. A worse effect is that cattle of such poor race and so badly fed give very little milk, while their value as meat is very low on account of the distance from the consumption centres.

In considering the above facts, it must be borne in mind that, in the districts which are not self-supporting, for instance, an ox does not weigh more than 150 to 200 kg. live weight, while it reaches 450 to 600 kg. in the self-supporting districts.

The exact position with regard to the nutrition of the inhabitants in these poorer districts of Yugoslavia, or rather their under-nourishment, can only be ascertained by exact methods—that is to say, by investigating life in the families. Such investigations have, however, only been made for a very small number of families, and cannot be regarded as applicable to regions as large as the districts which are not self-supporting. There are, however, indications of other kinds. The results of recruiting, for example, which grow constantly worse in these districts, show that the nutrition is inadequate. In this connection, we may also mention the low sanitary standard of the people in these districts, in which tuberculosis is particularly widespread.

These facts are sufficient to show the gravity of the problem in these districts. The inhabitants, who usually live isolated in the mountains at a distance from the main roads and railways, suffer in two ways ; first, from the penury of nature in their districts, and, secondly, from

the necessity of making good the shortage of certain foodstuffs by the sale of those of which they have less need. This state of affairs is aggravated by the fact that most of the inhabitants are on such a low level of civilisation that they have scarcely begun to think of co-operative societies, by means of which they could sell their products to better advantage and improve their position. The products which they sell and buy have to bear heavy transport costs and middlemen's profits. As an illustration, we may state that, in the remote districts of the banovine of Zeta (Montenegro), a lamb costs only 3 to 5 dinars, as against 40 to 50 dinars at Belgrade, while the price of maize is 100% higher, and that of wheat 75% higher, than in the producing districts. A year ago, sixty to eighty eggs were sold for 10 dinars in the villages, while only twenty were obtainable for 10 dinars at Belgrade.

Before the depression, various families in the districts which are not self-supporting made up for the shortage of their foodstuffs by money received from members of the family who had emigrated or who worked in the country itself, either in the forests or in industry, or who were employed in the large towns. The depression, however, has greatly reduced these sources of income and rendered them inadequate. The sums received from Yugoslav emigrants, for instance, amounted until 1929 to about 1,200,000,000 dinars a year, while they are now only 120,000,000. The forestry industry in Yugoslavia, which is also suffering from the depression, is in a state of stagnation; this affects, in particular, the districts which are not self-supporting, since the large forests are situated in these districts—namely, in the banovines of Drave, Save, Verbas and Drina. The resulting poverty is of two kinds: a reduction in the possibility of employment and a decrease in wages. From 1930 to 1935, the average wages of forest workmen were:

Year	Dinars per month
1930	688.00
1931	651.60
1932	558.88
1933	527.11
1934	500.22
1935	491.75

It will be seen that, in 1935, a forest workman earned scarcely more than 16 dinars per day. The table of earnings of a sawmill worker during the same period shows that the wages were barely sufficient to maintain life:

Year	Dinars per month
1930	990.00
1931	918.00
1932	801.88
1933	602.17
1934	481.83
1935	479.39

In 1930, therefore, the daily earnings of a sawmill worker were much higher than those of a forest worker, while in 1935 they were lower. The only explanation of this fact is that the earnings of a forest worker cannot be lowered under the present level, since his work is harder than that of a sawmill worker. The gradual reduction in the earnings of the forest worker as opposed to the sudden reduction in the earnings of the sawmill worker shows that this assumption is well founded. In order to estimate the above particulars at their true value, it should be remembered that the timber industry was already in a state of depression in 1930, and that the difference between the earnings before the depression and at the present time is greater than appears from the above table. Naturally, the workers in the districts which are not self-supporting who work as employees only during the season, principally in agriculture, have difficulty in effecting any savings and in sending a little money to their struggling families.

The problem of the districts that are not self-supporting is one of a large number of highly complicated problems with which Yugoslavia is faced. It is difficult to foresee the outcome. One thing is, however, certain: agriculture cannot serve as a basis for any radical change. Capital is not available to exploit the mineral wealth and the waterfalls. The only means of rescuing the inhabitants of these districts from famine would be to employ them in industry and its auxiliary branches.

A SURVEY OF THE MEASURES TAKEN IN CERTAIN COUNTRIES BY GOVERNMENTS, PUBLIC AUTHORITIES AND NATIONAL ORGANISATIONS TO BRING ABOUT AN IMPROVEMENT IN THE NUTRITION IN VARIOUS SECTIONS OF THE POPULATION.

CHAPTER I.

MEASURES TAKEN ON BEHALF OF MOTHERS AND INFANTS.

All civilised nations regard social hygiene as founded upon the welfare of mothers and children, and that, in turn, as based on rational feeding. The principle is universally recognised ; the means of putting it into effect (clinics, milk dispensaries, etc.) vary from country to country.

Union of South Africa.

(a) The larger local authorities in the Union of South Africa (Johannesburg, Cape Town, Pretoria, etc.) have for many years been conducting maternity and child welfare clinics for necessitous persons. At these, instruction is given by health visitors and medical officers in food values and feeding methods ; at most of them, food is issued in the form of fresh and dried milk, cod-liver oil and malt and, in some instances, meals are provided free to nursing mothers.

(b) In many of the smaller towns where local authorities are not strong enough financially to conduct welfare clinics, national women's organisations run maternity and child welfare centres on similar lines to those of the larger local authorities. Such organisations are the National Council of Women (which operates throughout the whole Union), Afrikaanse Christelike Vroue Vereniging (Cape Province), Suid-Afrikaanse Vroue Federasie (Transvaal), Oranje Vroue Vereniging (Orange Free State) and the Natalse Christelike Vroue Vereniging (Natal).

Argentine Republic.

In June 1935, the Municipal Institute of Nutrition set up a social service for supervising and protecting healthy individuals (see Chapter VII). This service has a canteen which supplies food to pregnant women and nursing mothers whose means are too slender to provide them with an adequate diet. This is not regarded as charity but as social assistance. Assistance may be either partial or extend to the whole family, food being supplied to one or more of the other members of the family, as may be necessary to provide them with a rational diet

in accordance with the advice given by the Institute. This service is attached to the Consultation Service for the Nutrition of Healthy Persons.

Australia.

Federal Capital Territory.

MOTHERCRAFT CENTRES.

Advice on dietetics is the principal function of a fully trained nurse at the mothercraft centres. The total attendances have reached about 4,000 per annum. Further, clinic emulsion of cod-liver oil is given to the necessitous, and, where these have an inadequate milk supply, a free issue of milk is arranged. Ante-natal dietetic advice is given to mothers, and the centres are generally a source for the dissemination of information on "protective foods". Children over one year of age are utilising the service provided by the mothercraft centres to an increasing extent. For the year 1934-35, 1,000 such visits were made. A second nurse is being appointed to supervise the health of the pre-school child by visiting all homes, district by district, throughout the year. Dietetic inadequacies will be corrected and the Department of Health has available funds for the provision of extra milk for children when required.

Weight charts are kept of all infants attending the mothercraft centres. In the examination of schoolchildren, particulars of general nutrition, weights and heights are taken, together with a full examination, inclusive of noting the signs of any deficiency diseases. On the whole, the children are overweight as compared with the table prepared for children of New South Wales over a wide experience.

The State of New South Wales.

FOOD DISTRIBUTION TO CHILDREN OF UNEMPLOYED.

In order to supplement the diet of individuals who are dependent upon unemployment relief work or gratuitous food or clothing relief, and who, for any special reason, require extra nourishment, certain provision is made to meet such requirements.

Expectant and nursing mothers, infants requiring special foods, children showing evidence of under-nourishment or convalescing from illness may, on presentation of satisfactory medical certificates, obtain extra foods, such as milk, eggs, green vegetables, cod-liver oil, etc. The cost to the Government of such additional foods approximates £80,000 annually at the present time.

The State of Victoria.

BABY CENTRES.

In Victoria, there are 150 baby health centres which are subsidised by the State Health Department and local authorities, at which expectant mothers and mothers with infants can obtain advice without charge.

The centres are under medical control and their advice is largely on the matter of diet and nutrition, the babies being weighed on each attendance and the weights being recorded on a card. Local authorities, by special grant, empower the nurse-in-charge to issue to mothers or children orders for dried milk powder or cow's milk in cases of under-nutrition.

No Government or municipal provision is made for medical supervision of children between 2 to 5 years. A voluntary organisation known as the Kindergarten Union has established crèches and kindergartens in all poorer-class districts in the metropolis. These institutions have a medical staff and undernourished children receive special attention. All children attending kindergartens have meals provided, which always include a ration of milk.

The State of Tasmania.

CHILD WELFARE ASSOCIATIONS.

In Tasmania, the Child Welfare Associations at Hobart and Launceston, supported by Government aid, take practical measures to provide milk to mothers and infants in necessitous circumstances, and arrangements are being made to supply under-nourished schoolchildren throughout the State with milk daily.

The State of Western Australia.

In the case of persons in Western Australia in receipt of State relief, special additional relief for the purpose of providing extra milk to pregnant women and nursing mothers is given.

Territory of Papua.

In Papua, assistance to mothers, infants and schoolchildren remains mostly in the hands of the various missions, which are subsidised by the Government for this and other purposes.

Mandated Territory of New Guinea.

In New Guinea, attempts are being made by the missions (assisted by the Administration) to encourage expectant mothers and mothers of new-born children to attend clinics for treatment and advice, but progress is slow owing to native suspicion of interference with any variation of their own methods of dealing with (i) midwifery, by other than their own village midwives; (ii) supplementary diet of infants, other than that of the universal custom of use of foster-mothers, and carbohydrate foods masticated by the mothers or foster-mothers before being given to the infants.

Attempts are also being made, but with little success, to change the practice of mothers of newly born infants returning to work in the gardens a day or two after delivery and working all through the lactation period.

Austria.

In Vienna, expectant mothers, if they or their families are on the welfare register, receive coupons for cheap milk (half a litre at 10 groschen instead of the usual 23 groschen), from the seventh month of pregnancy onwards. There are at present 600 women in receipt of such coupons.

(Certain additional particulars will be found in Chapter III below, page 107.)

Belgium.

In Belgium, the Law of September 5th, 1919, instituting the "Oeuvre nationale de l'enfance" (National Child Welfare Organisation), made provision for the feeding of very young children (milk dispensaries), and also for the establishment of canteens for mothers, at which a rational and substantial meal was supplied to nursing and expectant mothers in indigent circumstances. These nutritional institutions were a continuation of the organisations set up during the war period, when nutrition in general was conspicuously defective. Their fortunes fluctuated as the attendance at these institutions gradually dwindled and in many places finally disappeared altogether. The canteens for mothers were wound up in 1927.

The only organisations which continued to operate were a certain number of milk dispensaries; but these, too, lost much of their value. At present, they still continue in certain places, but in a slightly different form. Milk is no longer distributed there, its place being taken by "special diets" prepared in accordance with the prescriptions of the medical officers in charge of infant clinics.

In recent years, great efforts have been made, with satisfactory results, to enable the population, and the mothers on the registers of the infant clinics in particular, to procure properly treated and supervised milk.

The supervision is exercised by the State services and those of the larger communes, and applies first to producers and secondly to retailers. Laboratory analyses make it possible to supply pure milk to institutions and individuals, either through the milk retailers or through the numerous dairies, the installation of which is constantly improving.

As a special contribution towards the welfare of children suffering as a result of the economic crisis, the "Oeuvre nationale de l'enfance" has authorised the infant clinics to give such clients as have the best claims gifts of foodstuffs during the winter months, of which condensed milk is one of the chief.

United Kingdom.

(a) In England and Wales, the local maternity and child welfare authorities (which comprise the councils of all administrative counties and county boroughs and of certain non-county boroughs, urban districts and rural districts) have power, by virtue of the Maternity and Child Welfare Act, 1918, to make arrangements, with the sanction of the Minister of Health, for providing extra nourishment for expectant

and nursing mothers, and for children under the age of 5 years who are not being educated in schools recognised by the Board of Education. Such arrangements, which apply where extra nourishment is required on grounds of health, are encouraged as a desirable ancillary provision of the maternity and child welfare service. In April 1930, local authorities who had undertaken this service with the Minister's approval were given a free hand to extend this form of provision to such an extent and in such manner as they might think desirable.

Since 1929-30, there has been a large expansion of attendances at centres and ante-natal clinics. The attendances of children under 5 at centres increased, in England and Wales, from 7,173,782 in 1931 to 8,049,900 in 1934; the attendances of women at ante-natal clinics from 728,897 to 971,343, and the number of women attending them from 204,472 to 253,108. In October 1934, local authorities were reminded of the powers which they possess to assist expectant and nursing mothers by the supply of milk, and were recommended to make full use of those powers. Milk may be supplied free or at less than cost price, according to the means of the applicant determined by a scale of income suitable to the circumstances of the locality; and it may be supplied in the form of liquid or dried milk, the latter usually being supplied at infant welfare centres.

At the end of 1934, out of 422 maternity and child welfare authorities in England and Wales, 393 were supplying milk free or at less than cost price to expectant mothers, 397 to nursing mothers and 398 to children under 5. A large proportion also supply foods other than milk, and some make arrangements for the supply of meals to expectant mothers and young children. Health visitors are also available to give advice to mothers on the feeding of children, and instruction is also given at maternity and child welfare clinics individually and collectively.

Arrangements for the supply of milk and other foods are also made by charitable organisations, but the number of such organisations cannot be stated.

(b) Local authorities in Scotland have all framed schemes of arrangements for maternity and child welfare. These schemes are financed partially from local rates and partially by means of a Government grant paid as part of a general Exchequer grant. The schemes of arrangements have all received the sanction of the central Department of Health. These schemes include provision for :

(i) Health visitors who give instruction in suitable dietaries in the homes ;

(ii) Maternity and child welfare clinics, where, by talks, practical demonstrations and the distribution of leaflets, advice in proper nutrition is given ;

(iii) Food and milk to be given in necessitous cases under medical advice. Special attention is given to cases of malnutrition, rickets, etc. Cod-liver oil, malt and ultra-violet ray treatment may also be provided in suitable instances.

Bulgaria.

The health centres attached to almost all the urban or rural health services in Bulgaria give advice and consultations free of charge on the care of children and their food in particular. The charitable organisations attached to the stations, and also the municipal authorities, assist poor mothers and children by distributing milk and foodstuffs.

Estonia.

Under the Social Assistance Law now in force in Estonia, the local communal administration undertakes to supply poor mothers with food during the ninth month of pregnancy and the six months of lactation following childbirth. Food is distributed to poor mothers and infants through the maternity consultation centres, of which there are now twenty-five.

Finland.

In Finland, the consultation centre in connection with the Government Clinic for Women gives instruction in matters relating to the dietary of mothers. The Exhibition of Workers' Welfare and Assistance, which is permanently open at Helsinki and has a travelling section in the industrial areas, has a special branch for nutrition questions, where the proper feeding of infants is explained orally and graphically. The Government allots grants to private societies working in the field of child welfare, and also for the improvement of the dietary of mothers and infants.

In each of about 300 communes there is a nurse, who, when visiting families and consultation centres dealing with the care of infants, gives instruction to mothers in the care of children and also in dietary questions. In connection with these consultation centres, several communes have organised maternity departments for the benefit of expectant mothers, and these also give advice as to the proper feeding of mothers. Some communes and industrial establishments have vocational schools where girls are taught, in addition to the ordinary curriculum, the theory and practice of cookery and the care of small children. Future mothers and nursemaids are thus able to obtain an elementary knowledge of the subject.

Some private societies and some industrial establishments maintain, like the communes, infants' consultation centres, to which a nurse and doctor are attached. The chief of these are two societies covering the whole country—the General Mannerheim League for Child Welfare and the People's Health Foundation—which maintain a large number of consultation centres and nurses' homes at their local sections throughout the country.

The societies have also arranged courses for mothers in the care of children and diet. Pamphlets dealing with these questions have been

distributed in the people's homes by midwives and nurses. A committee appointed by the General Mannerheim League to frame a special diet for pregnant women is now engaged in composing a pamphlet on the question.

The milk-distribution societies maintain centres at which, as in the centres already mentioned, advice is given to mothers; milk mixtures ready for use are also distributed to poor mothers. There are also children's homes for mothers and children leaving maternity hospitals, where the mother and her child may remain as long as a fortnight, the mother being allowed to go out to work. The homes teach the mothers the proper way to prepare food.

France.

In a number of towns in France, milk dispensaries have been organised under medical supervision. Trained nurses prepare perfectly sterilised milk diluted according to the ages of the infants. The milk is subjected to regular bacteriological examination, and is sold to the parents at the lowest possible prices, often at prices below cost price, or even given gratuitously. Advice in the feeding of infants is given free. These milk dispensaries are dependent on donations, subsidies and the service of voluntary workers.

Milk dispensaries of this kind are very numerous in the coal-mining districts of Northern France, where thousands of children benefit by them. Dairies are attached to them in which the milk is handled under the most hygienic conditions for feeding to new-born infants and older children. Various companies (*e.g.*, the mines in Lens and Béthune) run farms with a view to securing pure milk.

The expansion of social institutions like the milk dispensaries has been checked by the operation of social insurance, which provides allowances for mothers and children. Many employers have been compelled, in practice, to cease to contribute to work of this kind, since the Health Insurance Funds, to which they contribute, give their members an allowance for milk.

Indigent children are received in day nurseries, where they are given food, under medical supervision, suitable to their state of health.

Iraq.

In Iraq, infant and child welfare clinics are established in the larger centres of population and are gradually being extended. Instruction in the feeding of infants and children is an important feature of these clinics. It is recognised that such work should be extended throughout the country and should penetrate, not only into the smallest villages, but also into the tribes. Trained women personnel for such work is a matter of slow growth in this country, but the necessity for this work is recognised.

Italy.

In Italy, the National Maternity and Child Welfare Organisation has devoted attention to the problem of the nutrition of mothers and children, both as a collective problem and in its individual application.

As regards individual assistance, that organisation entrusts to the medical officers in charge of its pediatric and obstetric centres, established in thousands of communes, the task of giving, where necessary, useful advice in the matter of nutrition, even prescribing in certain cases special foodstuffs, which are distributed free by the welfare committees in each commune, to supplement the ordinary dietary of assisted persons. This includes the distribution of food tickets, cows' milk obtained according to specific regulations, powdered milk of national manufacture, breadcrumbs, alimentary pastes, semolina of rice or wheat (instead of flour), beet sugar, fruit juice (orange, lemon, grape, peach, pear, etc.), tomatoes, olive oil, malt, for the preparation, with sugar, of cows' milk.

Milk, fresh or in powdered form, put up in bottles by the milk dispensaries, is of special importance. It supplements breast-feeding when necessary or, when absolutely necessary, replaces it.

For collective purposes, the organisation has decided to adopt four types of dietaries for children and adolescents from 3 to 15 years receiving assistance in special institutions. This decision is the result of exhaustive studies by highly competent physiologists.

The organisation has arranged for different types of meals which are provided in its kitchens for mothers and for pregnant or nursing women. These meals represent about 1,500 to 2,000 calories and correspond to the requirements of persons who can already obtain a certain dietary, simple though it be, in their own families.

Similarly, much care has been devoted to the nutrition of children after weaning, in the day nurseries, with the object of supplementing the dietary which they obtain in their family. For infants, the calorie requirements in the form of foodstuffs must be calculated in proportion to the weight of the body in each particular case.

The National Maternity and Child Welfare Organisation also concerns itself with the distribution of meals (soup and bread) for children of pre-school age attending infant schools; it contributes directly towards the expenditure, which is on a vast scale.

Netherlands.

There are almost everywhere in the Netherlands dispensaries for pregnant women, infants at the breast and other young infants. Private societies distribute milk and eggs to indigent women in childbirth.

Poland.

There are 225 health centres in Poland under the Ministry of Public Assistance which include sections for maternity and infant welfare; other welfare centres have been set up independently.

Milk dispensaries, of which there are 396, represent one of the most important forms of welfare activity. They prepare, on the instructions of the doctor, food mixtures (milk mixed with water and sugar) or medicinal mixtures (Moro, Klein-Schmidt, albumenised milk, etc.), and issue milk at the rate of half a litre per day per head. Some sections also supply such foods as fat, coffee, sugar, etc.

The centres are attended by 121,500 children and 16,500 mothers, and, during 1934, 3,403,000 litres of milk were distributed to mothers and infants.

There are also in Warsaw many small local organisations, such as the Association for Infant Welfare, which feeds about 330 children in four sections, and also organises crèches in factories.

Very good work has also been done by institutions in the nature of mutual provident organisations. The "Railwayman's Family" is one of the most active. During the year 1934-35, this organisation fed 900 children in the eight principal railway centres, by giving 166,336 free meals, apart from money grants to very poor widows.

Under an Order of the Ministry of Social Assistance, all undertakings employing one hundred women or more are obliged to maintain crèches. During the day (from 9 a.m. to 4 p.m.), the children are fed either in the crèche or by their mothers, who visit them for the purpose. In 1935, there were thirty-seven crèches in State factories and forty-four crèches in private factories. The number of women employed was 28,968 and the number of children in the crèches 610.

Roumania.

The nutrition of mothers and young children is watched over by child doctors at consultation centres established by dispensaries and hospitals, which are visited by healthy as well as by sick children. Home visits are paid by nurses, who give advice on feeding. Similar consultations are held at schools of child welfare in maternity homes and obstetrical wards. There are special child dispensaries in the towns of Bucharest, Cluj, Iassi and Timishoara.

The number of children whose nutritional condition is thus supervised is very small by comparison with the numbers throughout the country which escape control. The district doctor, in whose charge these children come, has to look after a population varying from 10,000 to 37,000 persons, and the result is that health control is inadequate or non-existent for the great majority of Roumanian children, especially in the country.

The care of abandoned children is a matter for the State which has seven centres for child protection and is about to establish four new ones. Each centre has an institute and a home colony in which the children can be placed. More than 3,000 children are maintained in these centres and colonies.

The Child Welfare Institute at Bucharest established by Royal Decree is charged with the responsibility for co-ordinating the activities of the State and private organisations, which operate on lines parallel to the State undertakings. Among these the Principele Mircea Society and the Association for Housewives carry on important work for child protection, as well as a whole series of other bodies.

For working mothers, crèches are established in certain places near factories.

Switzerland.

The number of philanthropic associations for mothers and infants at the breast is very large.

In almost all cities there are (in addition to dispensaries and maternity hospitals) nurseries which receive and rear infants, infant homes and crèches, to which working mothers can entrust their children during the day, together with milk distribution centres, which prepare food for infants with careful attention to quantities, and which give free advice, etc.

All these organisations are under medical supervision. They are financed by donations and grants and frequently by modest contributions from the parents of the children concerned, while they command the services of volunteer workers.

United States of America.

In the United States, assistance to mothers and infants has been developed for a number of years through the activity of the Federal Children's Bureau working in the States through the child hygiene divisions and in local areas through infant welfare agencies. This work will be further expanded under the Social Security Act.

Certain relief agencies, both public and private, have at times distributed a part of their relief in kind. This has been especially true of milk and milk products, and local welfare agencies have frequently had funds for distribution of milk to children and nursing mothers. Studies show the improvement in the nutritive value of diets as well as an increase in the total amount of food consumed with such food distribution (see also Chapter VII, page 257).

Yugoslavia.

HOMES FOR INFANTS AND YOUNG CHILDREN.

Six of these homes were opened before the war by the Government and by private persons; three were opened during the war and twenty-one after the war.

The modern homes for infants and mothers are the following :

Home for Infants and Mothers of Her Majesty Queen Marie, at Ljubljana, with 30 cots for infants; it is subsidised by the Government and by private associations.

Home of the Mothers' Union at Belgrade, with 90 cots for infants and young children ; it is maintained at the expense of the Government and of private associations.

Municipal Home for Mothers and Children at Zagreb, connected with the Municipal Dispensary for Children and Children's Colonies ; it has 37 cots for infants ;

Government Home for Mothers and Infants at Novi Sad, with 16 cots for infants.

Section of the Working Women's Refuge at Belgrade for mothers and infants, with 12 cots for the latter.

In addition, there is a consulting clinic at Belgrade belonging to the Russian Red Cross, for children up to the age of 14 years.

The National Women's Association at Split has a milk kitchen and a consulting clinic for mothers.

The "Crust of Bread" at Novi Sad has a dispensary, a kitchen and a day-nursery for children.

The Home for Railway Employees at Zagreb contains twenty-five cots for children up to the age of 2 years ; it is maintained by private persons.

The Home for Foundlings at Split, with 12 cots, belongs to the Government Hospital.

The Home of the Mother's Union at Sarajevo is subsidised by the municipality. It also receives unmarried mothers in an advanced state of pregnancy.

HOMES FOR YOUNG CHILDREN.

The Orphanage of Jelacić, with 120 cots, has a section for children from 5 to 7 years. It is maintained at the cost of the Banat.

Similarly, the Banat Home for Children at Ljubljana has two sections, one for children from 1 to 3 years and the other for children from 3 to 7 years, with 20 cots.

The Children's Home, "Srpska Majka" at Belgrade receives children from 3 to 7 years. It contains 40 cots and is maintained at the cost of the "Srpska Majka" (Serbian mother) Association and the town council. This association has, in addition, three consulting clinics in the villages.

There are seventeen other children's homes which admit young children and children of school age.

The former Foundlings Home, with 45 cots, principally admits illegitimate children.

There are also 102 orphanages for children of school age, 84 of which are private and 18 governmental, housing 4,800 children from 6 to 16 years.

The *milk kitchens* are mostly connected with consulting clinics for mothers and with polyclinics. There are eleven in Yugoslavia.

The Milk Distributing Centre was founded by French soldiers from the Salonika front. It is subsidised by the French and Yugoslav Governments.

There are also many day nurseries for infants and young children, especially at Belgrade, Zagreb and other large towns. Similar institutions are beginning to be established in the villages.

CHAPTER II.

MEASURES TAKEN ON BEHALF OF CHILDREN OF SCHOOL AGE AND YOUNG PEOPLE.

In a number of countries, children attending school can obtain food from school canteens, school kitchens or school soup kitchens. These are usually provided or subsidised by the municipal authorities for the benefit of children of parents in indigent circumstances, or parents who are prevented by their work from giving proper midday meals to their children.

Milk distribution, which was originally the simplest form of school meals, is tending to become the most usual form for the supply of additional food, since milk has been recognised to possess exceptional qualities as a protective food. Milk distribution has shown the effects of a rational diet on the physical and mental development of the child.

Union of South Africa.

A governmental scheme for supplying poor children with free milk was inaugurated in November 1935. About 12,000 children in the peninsula (boys and girls, European and coloured) each received half a pint of milk a day

The scheme will gradually be extended to all the schools in the peninsula. By the time the whole scheme is in operation throughout South Africa next year, it is estimated that 425,000 children will participate in the distribution of the milk. This means that the consumption of milk by these children will total more than 5,000,000 gallons a year.¹

Argentine Republic.

ACTION BY CENTRAL AUTHORITY.

The National Council for Education has, for a long time past, organised free canteens, at which lunches are served to poor children. Institutions for supplying them with milk, bread and hot drinks have been in existence for more than thirty-five years.

¹ See below, Chapter V, page 147.

Dr. Ramon J. Carcano, who was at that time Director of the National Council for Education, undertook the systematic organisation of these activities and gave a great impetus to the movement; the Municipal Institute of Nutrition drew up a nutrition manual for schools, and enlisted the co-operation of the military garrisons in the Argentine. This was in 1932; on August 4th of that year, Law No. 11597 was promulgated, which provided funds by means of a tax on the prizes won at horse-races at the national race-course, the yield from which is over one million pesos. In 1932, these funds were sufficient to feed 6,800 schoolchildren; last year, more than 10,000 children were fed in twenty school canteens and two canteens for mothers. According to the data for last year, meals were given to 3,936 children in the barracks in various parts of the Republic.

In the schools run by the State, there are co-operative societies supported by the local inhabitants, which organise the distribution of milk, etc.; according to the 1932 figures, the services of these co-operative societies were utilised by 93,899 children in the Federal capital alone.

The Central Authority provides holiday colonies for weakly children, of whom over 30,000 are sent to the sea or the mountains each year, where they are given board and lodging during the summer months. Similar holiday colonies are run by the Central Authority for the children of army officers.

ACTION BY LOCAL AUTHORITIES.

The municipality of the city of Buenos Aires also runs nine holiday colonies for weakly children, which are open during the three summer months. They have accommodation for 12,000 children, which enables more than 30,000 to benefit each year. The children remain in the colonies during the day and receive three meals—breakfast, lunch and dinner—free of charge.

The municipality also runs three children's canteens, open all the year round, each of which can accommodate 150 children, and day nurseries with accommodation for 200, where mothers can leave their children for the whole day.

Decree No. 7279, promulgated on December 31st, 1935, provided for the establishment of a canteen with accommodation for 500 children in each of the nine municipal holiday colonies. These canteens are reserved for primary schoolchildren of both sexes; in accordance with the decree, the first three canteens must be opened within ninety days in the poorest parts of the town.

The Public Assistance Department of Buenos Aires possesses a seaside colony at Necochea, which admitted about 3,500 children this season.

The Government of the province of Buenos Aires has established at La Plata a holiday colony with accommodation for 250 children, and another at Tandil, with accommodation for 150 children. The local municipality and the co-operative associations have jointly organised

the following holiday colonies : at Avelleda, with accommodation for 800 children ; at Quilmes, for 200 ; at Sierra de la Ventana, for 120 (this is a residential colony) ; at Lomas de Zamora, for 200, and at San Isidro, for 105 children.

The school boards of certain provinces run public canteens at which lunches are served free of charge to poor schoolchildren. The largest one is that organised by the school board of the province of Buenos Aires.

Australia.

The State of New South Wales.

CHILD ENDOWMENT.

Within the Commonwealth industrial jurisdiction and that of all States except New South Wales, the living wage is based on the requirements of man, wife and two or three children. But the industrial law of New South Wales prescribes man, wife and one child as the family unit on whose requirements the living wage shall be determined. And the State, in recognition of the limitation thus implied, pays child allowances without distinction of occupational grade. When such payments are made, the income limits are strict. The total income, including the child allowances paid by the State, may not exceed the living wage plus 5s. for each dependent child in excess of one.

ASCERTAINMENT OF MALNUTRITION.

For many years, the state of nutrition of schoolchildren has been closely investigated by the medical staff of the Education Department. In the course of a routine medical examination of 80,000 children in the metropolitan district of Sydney by the school medical officers, the incidence of notifiable malnutrition was 1%. In a recent intensive survey of 2,658 children, the incidence in two schools was found to be 2.3% and 1.2% respectively. Such instances of malnutrition are, of course, not necessarily due to lack of food, but may be due to the interaction of a number of factors, such as ignorance of parents, unsatisfactory selection of foodstuffs, neglect of hygienic requirements, constitutional or other defects, causing inability to assimilate food, or even the presence of some disease.

The State of Victoria.

CARE OF SCHOOLCHILDREN.

All children attending Government and State schools are medically examined at regular intervals by Government school medical officers. Cases of anæmia and malnutrition are noted and reported to the teacher for special attention. The Government has for several years given a subsidy to provide for an issue of milk to schoolchildren during the winter.

months. "Mothers' Clubs", which are associations of the children's mothers, have collected funds and devoted them largely to supplementing this milk ration for children who showed signs of malnutrition.

The State of Western Australia.

The means by which the State authorities in Western Australia have been able to gain a general view of the presence or otherwise of malnutrition amongst children has been the medical examination of schoolchildren by departmental officers, and this has not brought to light undue prevalence of malnutrition amongst children. It is possible, however, that parents have frequently deprived themselves of proper food in order that the children shall not suffer. Any cases of malnutrition are notified to the parent by the medical officer, when discovered.

The principle of supplying free milk to children in schools has not yet been adopted, but approximately 4,000 eight-ounce bottles of milk are delivered at metropolitan schools daily at a cost of 5*d.* per week to each child.

Federal Capital Territory.

The regular medical inspection of schoolchildren is carried out by the medical officer of health, and all defects, including cases of children who are more than 10% under weight, are reported to their medical advisers or the hospital for treatment. In 1935, the figures for the two largest schools as compared with the New South Wales Education Department's height-weight table indicate that the "entrants" boys were slightly over $\frac{1}{2}$ lb. over weight; the "entrants" girls 1 lb. under weight; the "leavers" boys 4 lb. over weight; and the "leavers" girls 1 lb. over weight. Although no free issues of food are made, advice by pamphlet is available on nutrition, the "protective" foods being stressed.

The State of South Australia.

During recent years, when unemployment was heavier than usual, some philanthropic institutions provided a hot meal for needy schoolchildren, and, in connection with some of the State schools, parents who are able pay a small sum each week, which is supplemented by the "Mothers' Clubs", to enable a supply of milk to be given to infant children each day.

Austria.

THE FEEDING OF CHILDREN.

Practical measures are taken by provincial and local authorities in Austria, and also by private organisations, in the endeavour to ensure the feeding of children.

In the Federal capital, Vienna, these activities take many forms :

MEALS FOR SCHOOLCHILDREN.

Every weekday, and even during the holidays, children of school age are given a hot ready-prepared midday meal of meat and vegetables and a sweet, or meat with bread and a sweet in sixty-two canteens situated on school premises. A few children who have left school also share these meals. Most of the children receive the food free of charge. The average number of participants is 8,200. Similarly, about 900 children are given a midday meal of the same type in three large municipal homes.

In addition, schoolchildren who attend homes conducted by associations are allowed by the Vienna municipality grants of money, graduated according to their parents' earnings, which are paid to the organisations conducting the home and from which these organisations supply the children with a hot midday or afternoon meal. On October 1st, 1935, about 5,300 children were receiving such relief.

MEALS AT KINDERGARTEN SCHOOLS.

In ninety-two municipal kindergartens, about 4,000 children from 3 to 6 years of age receive every working-day a breakfast of cocoa and rolls and a two-course lunch of a size suited to their age. Most of the children are given the food free, or on payment of only a few groschen.

MILK RATIONS FOR CHILDREN OF THE UNEMPLOYED.

Children of the unemployed who are on the registers (Zuständig) of Vienna receive during their first year of life half a litre of milk free daily, if the wage-earner has been at least twenty weeks out of work. About 1,800 children are at present benefiting by such relief.

FOOD PACKETS.

As part of the current monthly poor relief given by the Vienna municipality to children at home, "food packets" are distributed containing: $\frac{1}{2}$ kg. of flour, 1 kg. loaf sugar, $\frac{1}{2}$ kg. lard, $\frac{1}{2}$ kg. wheat-meal or 1 kg. first quality beans. A family receives up to seven food packets monthly, according to the number of children. On an average, 25,800 packets are issued per month. Large families receive, once a year, in addition to the above regular relief, a larger allowance, part of which is usually given in the form of food.

(Some particulars of assistance given in other parts of Austria will be found in the next chapter, pages 107 and 108).

MEANS OF ASCERTAINING THE STATE OF NUTRITION.

In the Federal capital, Vienna, statistics are available regarding the level of nutrition as ascertained on inspecting children in compulsory schools and municipal kindergartens. The condition is classified as "good", "average" and "bad". The following were the results of investigations recently made :

Year	Good %	Average %	Bad %
1925-26	23.6	50.5	25.9
1928-29	26.4	49	24.6
1930-31	30.8	45.6	23.6
1932-33	32.8	45	22.2
1934-35	31	46	23

Children up to 6 years of age belonging to the poorer population and the wards of the Youth Office have their state of health and nutrition regularly tested by doctors at the maternal welfare centres. Similarly, expectant mothers belonging to the poorer sections of the population are kept under supervision at the consultation centres for expectant mothers.

Older children (from 6 to 14 years of age) at child welfare institutions are given breakfast, midday meal and supper, and in the middle of the morning and afternoon they receive bread, the average daily ration of which is 250 grammes of black bread and 70 grammes of white. A special point is made of food that is rich in vitamins (extra fresh fruit). The daily supply of food, including bread, has, on an average, 2,000 to 2,300 calories of nutritional value. The diet of younger children is similar to that of the older children, 1,600 calories being the average nutritional value per head per day. In the case of this category, a special point is made of food that is as rich as possible in vitamins (green vegetables, fruit, etc.).

The provincial administration in Carinthia makes a special point of ascertaining the level of nutrition of children below school age and those of school age ; most of the former are dealt with at the maternal welfare centres and kindergartens, while all children of school age are inspected in the schools. In view of the conditions obtaining in the open country, it is extremely difficult to cover the rest of the population, and particularly to grade them by groups according to occupation and income.

Medical inspection of children is also carried out at public health centres and by school doctors in other provinces.

Belgium.

In Belgium, school meals were instituted on a general scale during the war in the communes of the occupied territory. All schoolchildren received a *couque* (sweet roll), which was greatly appreciated in the

prevailing bread shortage. Some communes went further and gave the children, in addition, a complete midday meal. The Law of September 5th, 1919, instituting the National Child Welfare Organisation (*Œuvre nationale de l'enfance*), retained the principle of school meals, and also made provision for canteens for delicate children.

As the economic situation changed and bread again became plentiful, the national *couque* lost its value and was gradually abolished in the majority of communes. In 1923, school meals were given only in certain places, and the Government accordingly struck out of the budget the grants made for the purpose, retaining only the grants for special food for delicate children. The grants for this latter purpose were abolished on financial grounds at the end of the school year 1930-31. There still, however, remain some thirty canteens for delicate children in large cities (Brussels, Charleroi, etc.). Their cost is met by the communes, with the aid, in many cases, of charitable organisations.

From replies received by the Belgian Government from twenty large communes, it appears that ten communes supply a complete meal; three, a milk ration; two, milk and soup; one, soup and bread; one, milk and a complete meal. As a rule, the meals are provided both for delicate and for necessitous children, in public and private schools alike. In certain communes, the delicate children receive more abundant meals than the necessitous children.

The distribution is frequently free in the case of necessitous children. In other cases, there is a special scale under which it is possible to determine the degree of indigence of the children. The children of unemployed workers come under the scheme of free distribution.

The position in regard to school meals in the commune of Ixelles, the school canteens of which are regarded as a model, may be taken as an example. The following are admitted to the school meals and to the canteens for delicate children: children from 3 to 14 years of age attending free schools, children of over 14 years of age who continue to attend a free primary school, young people under 18 years of age attending a free vocational school, and children from 3 to 14 years of age who are excused school attendance by a medical inspector.

Down to the end of December 1927, the local committee organising the food distribution never asked for any contribution on the part of the children attending the canteens; but since that date, a small charge has been made.

United Kingdom.

MEDICAL INSPECTION.

The Education Act lays upon local education authorities the duty of medically inspecting all public elementary schoolchildren at least three times during their elementary education—on admission to school, on their attaining the age of 8 years, and on their attaining the age of

12 years. School medical officers supply the Board of Education with a return of all defects, including malnutrition, found at these inspections. The Board also recommends that school medical officers should supplement these inspections by periodical nutritional surveys of all children not receiving meals, and that those receiving meals should be kept under medical supervision.

In Scotland, there is a routine medical inspection of schoolchildren in three selected age groups—5 to 6, 9 to 10, and 13 years—while children attending beyond the age of 14 years receive examination. This medical examination includes the assessment of the state of nutrition of the individual. Heights and weights are recorded and an assessment of the nutritional standard is made.

SCHOOL MEALS (ENGLAND AND WALES).

Since 1906, local educational authorities have had the power to provide meals for children attending public elementary schools who are unable by reason of lack of food to take full advantage of the education provided for them. These powers are defined in Sections 82-85 of the Education Act, 1921. Meals are supplied free to children whose parents are necessitous; but, if the parents can afford it, they are expected to pay the whole or part of the cost.

The method of selecting the children has varied in different areas from selection solely by the application of an income test to selection by the authority's medical officers. The Board has emphasised the view that selection by reference to an income test alone is not justifiable, and that regard should be had to the special circumstances of the child. The need of a child for feeding should not be considered only upon an application from the parent; the authority should themselves take steps to ascertain what children are in need of feeding, by inviting reports from the members of the School Medical Service or the Public Health Service, from teachers, school nurses, school attendance officers and others in regular contact with the children from day to day. Provision may properly be made for any child who shows any symptoms, whether educational or physical, however slight. Whatever methods of selection may be adopted, all children selected should be seen by the school medical officer, who will recommend the nature and extent of the supplementary feeding required and any other appropriate treatment, and will keep under review the condition and progress of all children receiving meals. The Board further recommends that authorities should consider the advisability of holding periodical nutritional surveys at which all children not receiving meals would be passed under review.

The meals supplied by local education authorities vary from one area to another. The most usual provision is of a midday dinner, but some of the authorities provide breakfasts, dinners and teas. Elsewhere, supplementary nourishment is given in the form of milk or cod-liver oil and malt extract. The total number of children getting meals, of whatever kind, is about 400,000.

MILK IN SCHOOLS.

Much evidence has been accumulated in recent years of the value of a supplementary ration of milk in addition to the ordinary diet, both for normal and malnourished children. For a number of years, most valuable work was done by the National Milk Publicity Council in encouraging the drinking of milk by schoolchildren. Under the auspices of this Council, arrangements were made directly between the teachers and the dairymen, the local education authority taking a benevolent interest but accepting no financial responsibility. This movement received a great impetus on the introduction, in October 1934, of the Milk in Schools Scheme, under the auspices of the Milk Marketing Board. It was decided as part of the Government's policy for the utilisation of surplus milk to place the sum of £500,000 at the disposal of the Milk Marketing Board in each of the years 1934 and 1935 to be employed mainly in a scheme for supplying schoolchildren with milk at a halfpenny instead of a penny for one-third of a pint. The scheme came into force on October 1st, 1934, and at once almost trebled the number of children receiving milk on payment in the schools by the extension of arrangements on a voluntary basis similar to those previously promoted by the National Milk Publicity Council. There was also at the same time a great expansion in the free provision of milk meals made by local education authorities under the Education Act, 1921. At the end of March 1935, some two and a half million scholars in elementary schools were paying for a daily ration of milk. To this should be added over 130,000 children or young persons paying for their ration in schools other than elementary, and some quarter of a million children receiving milk free—a total not far short of 3,000,000. It may be added that the scheme was also extended to junior instruction centres recognised by the Ministry of Labour, and a number of authorities have availed themselves of its benefits for the boys and girls attending these institutions.

Close attention is given to the character of the milk supplied, especially with regard to pasteurisation and the nutritive value of differing quantities. Investigations are now being carried out by a special body composed of representatives of the public departments and authorities concerned, including the Medical Research Council and the Rowett Research Institute, to study the effects of the feeding of different amounts of raw or pasteurised milk to children receiving: (a) no milk; (b) one pint of pasteurised milk; (c) two-thirds of a pint of pasteurised milk; (d) two-thirds of a pint of raw milk. This investigation is being conducted by four full-time medical officers in elementary schools in about five selected areas.

SCHOOL MEALS IN SCOTLAND.

Under the Milk Act, 1934, Milk Marketing Boards in Scotland have framed schemes of arrangements which have been approved by the Secretary of State for Scotland for the supply of milk to schoolchildren

throughout the school year. Approximately 400,000 children out of a total number of 800,000 receive one-third of a pint of Grade A (Tuberculin Tested) milk each school day (200 days in a year) at a cost of a halfpenny where they are able to pay, and free in necessitous cases. At four juvenile instruction centres, milk is supplied under the same conditions to young persons attending the centres.

The Education (Scotland) Act, 1908, empowers education authorities to provide accommodation, apparatus, equipment and service for the preparation and supply of meals to pupils attending schools within their district. Section 6 of the Act places upon education authorities the duty of providing meals in cases where a child is unable to take full advantage of the education provided owing to lack of food, if the parent is unable by reason of poverty or ill-health to make sufficient provision and the authority is satisfied that such provision will not be made by voluntary agencies.

The provision which authorities are empowered to make is not limited to necessitous children, but may cover any or all of the children attending any school. Where the school attended is at a considerable distance from the pupils' homes, education authorities often find it advantageous to make arrangements for the provision and supply of meals and to charge pupils whose parents are not necessitous a sum sufficient to meet the cost of the food supplied to them, no account being taken of the cost of preparation and service.

The following statement gives the number of children provided for and the number of meals supplied for the year ended July 31st, 1935 :

	Number of children	Number of meals
(a) Meals primarily for children suffering from lack of food	25,100	5,895,500
(b) Meals primarily for other children as a matter of convenience	29,200	3,209,600

For the most part, the provision made consists of one meal at midday. In some areas, the meals under (b) above are supplied during the winter months only.

The nature of the midday meal varies from a simple meal of soup and bread to a well-balanced meal of two complete courses with a different menu for each day of the week.

In addition to the provision of meals indicated above, the education authorities are responsible for the provision of supplements to diet, such as cod-liver oil, extract of malt, etc., for debilitated children, as part of the medical services, and also for arrangements for a daily supply of milk to children in the schools.

There are about eighty residential schools for boys and girls in England and Wales which are under the control of the Home Office and are approved for the reception of children and young persons sent to them by courts under approved school orders. The schools are of three grades :

junior, 10-15 years; intermediate, 13-17 years; and senior, 15-19 years.

The average in these schools includes half a pint of whole milk per boy or girl per day. Some senior and intermediate country schools maintain a good standard of health with one-eighth of a pint or little over; but comparatively few stand as low as this, three-quarters to four-fifths of a pint is the usual allowance, whilst some of the junior schools use a full pint per head.

Bulgaria.

In Bulgaria, free dining-rooms for schoolchildren have been opened. The poorer children and, when possible, all the children attending the elementary schools take their meals there.

Czechoslovakia.

(For distribution of milk to the children of unemployed persons, see next chapter, page 110).

Denmark.

In Denmark, the communal authorities are entitled under social legislation to arrange for school meals during the winter months, and this is done to an increasing extent.

Estonia.

The dietary of children in Estonia is in the hands of local relief committees. Nutrition centres have been set up in which children can obtain one hot meal a day eaten on the spot. Food in the dry state is sent to children who cannot come to the centre themselves, owing to their being too young, on account of sickness, or for any other reason. As unemployment declined, exceptional relief measures were reduced.

The following numbers of children were fed in this way: 1931-32, 26,010; 1932-33, 28,694; 1933-34, 9,589; 1934-35, 6,074. The relief scheme for the period 1935-36 provides for the feeding of 4,580 children.

Schoolchildren can obtain a meal at school during the recreation interval. The children pay full price, or 50%, or the meal may be given free at the expense of the school, according to the parents' situation.

Among the private organisations participating in the provision of food to children may be mentioned, in particular, the child welfare societies, which provide daily, throughout the year, hot meals for some of the poorer children. The organisations for collective assistance are chiefly active in the matter of relief for adults; they distribute food to adults through their nutrition centres, or provide parcels of dry foods.

France.

In France, the distribution of milk is a matter for the municipalities, not the State. In the north of France, there has been milk distribution for two years past in many schools, 25 centilitres being given at the morning break and the same in the afternoon. In certain schools, this distribution has been in existence for two years past, the parents contributing in varying degrees. The cup of milk tends to take the place of sweets, which some of the children used to bring in their pockets for their "tea" (*i.e.*, in break).

Italy.

School assistance in the form of food naturally varies according to local requirements, the class of school, the season and the circumstances of the children.

It is provided by provincial committees of the National Balilla Association, through the School Welfare Committees.

To take an example, the Rome School Welfare Committee has arranged two types of school meal, one for open-air schools attended by children who need special care owing to tuberculous antecedents in the family (this scheme provides complete meals), and the other for elementary schools (only soup with rice or macaroni, etc., and bread). This latter meal is served free of charge to children in the first grade, while those in the second and third grades pay contributions of 0.30 and 0.50 lira respectively.

In the present case of schools under the Rome School Welfare Committee, the schemes have been drawn up with the approval of the Rome Health Bureau, and special agreements have been made. There are numerous agreements between the authorities of the National Balilla Association, the local School Welfare Committees, and the municipal authorities. The "Ente Opere Assistenziali" (Organisation of Assistance Associations) of the Fascist Party also concerns itself in this work, both directly and by contributing to this form of assistance in consideration of such special circumstances as unemployment or poverty due to other causes.

In some of the larger centres, the School Welfare Committee also arranges—chiefly in summer—camps in the mountains or by the seaside on the same lines as those organised by other Fascist bodies. These camps follow schemes of diet in which particular interest is taken because the public authorities attach the highest importance to the rational feeding of children.

Latvia.

FEEDING OF PUPILS IN RIGA SCHOOLS.

The Riga municipality has arranged for hot meals to be distributed to pupils in all elementary schools. In 1935, the total number of elementary school children in Riga was 30,740, of whom 19,397 shared

these common meals. Of these 19,397 schoolchildren, 11,407 were fed free at the cost of the municipality. The total number of rations distributed in 1935 was 3,315,014, of which 1,902,192 were given free. The cost of a ration is about 15 centimes. The distribution of hot meals costs the Riga municipality about 300,000 lats a year. The School Board decides when meals are to be given free.

Netherlands.

Meals are given to schoolchildren in the autumn and winter where required. The number varies greatly. At The Hague at the present time, there are only some 160 children in receipt of free meals at the expense of the municipality. In other towns—for example, Amsterdam—the number of meals given to schoolchildren is very much larger.

Poland.

In Poland, the Ministry of Public Worship and Education is the central authority which co-ordinates assistance to schoolchildren through regional authorities (*kuratorinnis*) and heads of schools. Special parents' committees are set up for the purpose of organising additional meals in schools.

The necessity of giving more effective protection to the health of schoolchildren (particularly the problem of their dietary) is a pressing problem all over Poland.

Investigations made in schools have shown the necessity for feeding from 40% to 50% of the children.

The feeding of children is organised by school boards, parents' committees, local authorities, special committees and social organisations.

The distribution of additional food to schoolchildren is not organised on a uniform basis, as the extent of this form of assistance depends upon the funds appropriated and the initiative of school committees, parents and philanthropic societies. Feeding of schoolchildren is limited almost entirely to the towns and industrial centres, except in special circumstances as on the occasion of floods and bad harvests in certain areas. An important contribution to this form of activity is made by the social assistance authorities.

The necessary financial resources for this work are supplied by the Government authorities, more particularly by the district authorities, the Ministry of Social Welfare, the Labour Fund, local administrative grants, and by collections organised in secondary schools on behalf of elementary schools.

The feeding of elementary school children is designed mainly for the poorest children who suffer from anæmia (numbering 25%) and for children with a predisposition to tuberculosis (7%). Foods, sweet drinks, and especially milk, are distributed.

In urban schools, food is given systematically, chiefly during the winter. In country schools, the children are given soup (equivalent to 130 calories) and bread before harvest-time.

The following are a few figures :

(1) The Warsaw School Board spends 500,000 zloty in feeding from 25,000 to 30,000 children (25% of the total child population) annually.

(2) The Lodz Citizens' Committee feeds 25% of all children.

(3) The Crakow Voivodeship, 30,000 children.

(4) In Upper Silesia, 300,000 zloty are spent on 25,000 elementary and 4,000 secondary school children.

(5) In Poznan, 9,000 children are fed.

(6) In Polesia, there are 528 centres, where 9,400 children are fed; similar work is done in other districts.

During the holiday months, the Summer Camp and Day Camp Organisations look after the feeding of poor children by supplying them with food daily, either free of charge or for a nominal payment.

The average nutrition standards required by the Ministry of Social Welfare in educational establishments are as follows :

Article of food	14-18 years (grammes)	7-14 years (grammes)	3-7 years (grammes)
Bread	500	400	300
Milk	200	400	400
Sugar	50	40	30
Meat	90	70	30
Eggs (number)	1/7	1/7	1/7
Bacon	25	20	15
Fat	20	10	5
Butter	15	4	4
Peas	60	40	22.5
Groats	150	125	80
Flour	15	10	7
Potatoes	500	400	200
Vegetables, fruit.	150	120	70

Roumania.

In nearly all towns there are school centres maintained by the State, the commune or the department where midday and morning meals are provided. Thus, in Bucharest, there are eighteen canteens and child centres where more than 2,000 children are fed. Similarly, the Department of Ilfov maintains seven canteens. Owing to want of resources, the work of the canteens is restricted. In the city schools, only 10% of the children receive a hot meal, and in the country hardly any, though the need is great.

Periodical medical inspection of children is carried on by the district doctors. Investigations by Dr. Banu in 1930 on 2,149 children of school

age from both urban and rural districts showed that in 41% the state of nutrition was below the normal; the urban children showed the effects of under-nutrition more than the rural children.

Switzerland.

In Switzerland, the distribution of milk in schools at 10 a.m. has been organised on a large scale, supported by extensive propaganda.

In 156 places in Switzerland, schoolchildren receive pasteurised milk in bottles of 2 decilitres at 10 o'clock in the morning. The milk is sucked through a straw. The experiment, which is carried on under the auspices of the Swiss Milk Commission, is carefully followed by the doctors. It would seem to have given good results in practically every instance.

The milk supplied to the schools by the local milk organisations is sold to the children at 10 centimes the bottle; but many pay less, or are given the milk free.

The difference is refunded to the milk organisations by the local authorities. In the city of Basle, for instance, in 1934, 7,232 schoolchildren regularly received milk (representing 45% of all Basle schoolchildren).

Of this number, 3,890 paid in full, 3,202 paid in part, and only 140 received the milk free.

In addition to the distribution at 10 o'clock, there is, in some towns at any rate, a free distribution of milk and bread at 4 p.m. to children who remain in the schools to prepare their lessons (day boarders)—that is to say, generally, children whose parents work at a distance from their homes.

There are also school kitchens or school soup-canteens in the majority of urban areas of any size. These are generally organised by philanthropic groups in the refectories of the school buildings, which are handed over or fitted up for the purpose by the municipalities. The children receive a full midday meal free of charge or for a small payment (not exceeding 50 centimes a day).

Holiday settlements are organised on the same principle. They generally command the use of dwellings which are well fitted up in pleasant surroundings, mostly in the mountains.

Further, orphans throughout Switzerland receive the necessary care and attention to enable them to complete their apprenticeship to trades under suitable moral and physical conditions.

Turkey.

There has been a comparatively large extension of the efforts to provide poor schoolchildren in cities and small towns with a midday meal. Midday meals were served regularly to 5,223 children in different urban centres in 1935. A great part of these meals were provided by the Red Crescent Society, and others by the Child Welfare Society. In the

dispensaries established by the State or by the Society for the Campaign against Tuberculosis, foodstuffs are distributed free of charge. In 1935, the Child Protection Society arranged for the distribution of 64,751 litres of milk in different towns.

In 1934, some investigations were made in the elementary schools into the nutrition of children from 7 to 12 years of age. The method consisted in weighing the children. According to the results obtained, the level of nutrition was found to be very satisfactory. In some villages, the index number sometimes exceeded 100. No other method has hitherto been applied.

Rations in secondary boarding-schools and vocational schools are the following :

	Grammes
Bread	600
Meat	350
Fish	200
Rice	80
Butter	70
Sugar	110
Potatoes	225
Dried vegetables	120
Salt	20
Cheese	45
Milk	150
Green vegetables	250-300
Fruit	200

United States of America.

In the United States, the improvement of the dietary of schoolchildren has been developed through the schools. As a part of the relief activity in the States, school lunches have been supplied to children from families on relief or to definitely under-nourished children who could be certified as in need of the extra food supplied (see also Chapter VII, pages 254-256).

Uruguay.

The Uruguayan Child Welfare Association runs at its own expense eleven refectories, where children of school and pre-school age are given a rational and properly balanced dietary.

Yugoslavia.

In Yugoslavia, the school authorities are responsible for the running of school kitchens organised in the primary schools. School kitchens in which indigent pupils can get breakfast and lunch are organised in the principal cities with the help of private enterprise. In the villages and smaller towns, they are less frequent owing to the absence of material resources or philanthropic institutions of any importance.

NUTRITION OF ELEMENTARY SCHOOLCHILDREN.

The Primary Schools Law of December 9th, 1929, makes the School Committees responsible for organising school kitchens and child welfare work, and the Law of September 12th, 1930, dealing with the health of schoolchildren, enacts that "in any school, whenever it is found that the children are badly fed, there shall . . . be opened a school kitchen for feeding the pupils." Under the regulations, the policlinics supervise the school kitchens, while the school medical officers select the pupils who need to be fed in the school kitchens and also control the kitchens from the medical point of view. These efforts are supplemented, on an even wider scale, by private initiative. Thus, 532 school kitchens have been opened (year 1932-33), feeding 30,540 children daily.

In addition to these school kitchens, Queen Marie has opened eleven canteens for feeding schoolchildren. These canteens have been set up in the biggest educational centres at Belgrade, Zagreb, Skoplje, Ljubljana, Sarajevo, Split, Cetinje, Celje, Maribor, Plevlje, Krizevci; 2,000 children are fed daily in these canteens. In 1934, for instance, 477,852 meals were served.

The Red Cross, with the Junior Red Cross, has also set up school kitchens for feeding schoolchildren. The data for 1934-35 show that the Red Cross possessed 637 kitchens, at which 34,615 schoolchildren were fed daily.

In all, 67,155 children are supplied with meals through these agencies, the total number of elementary school pupils being 1,300,000.

CHILDREN'S HOSTELS.

There are in Yugoslavia 102 children's hostels, 84 of which are maintained by private organisations and 18 by the State. These hostels together contain 4,800 children between the ages of 6 and 16. Of these hostels, 50 were founded by religious (mainly Catholic) bodies, which provide for their needs.

SECONDARY SCHOOLS AND COLLEGES.

The Ministry of Public Instruction has opened a number of State hostels with the object of supplying food to indigent secondary-school pupils. Education and board are free in all these hostels. The banovines also organise hostels on lines similar to those of the State hostels. The budgets of the State and of the banovines further provide appropriations in each year for the maintenance and education of indigent secondary-school pupils. Private initiative is also active in this direction: and in this connection reference must be made in the first place to the support of the Royal House. The King Alexander Home for secondary-school

pupils, for example, educates and maintains a large number of indigent pupils free of charge. Hostels and school kitchens are also provided for indigent secondary-school pupils by parents' associations and school associations and a variety of cultural and humanitarian organisations such as the Red Cross, the " Education Society ", the women's leagues and religious associations.

There are many needy students in the Yugoslav universities. Most of the students come from poor districts, and their impecunious families can give them very little help ; a large number of students are entirely dependent on outside aid. This aid mostly takes the form of meals in canteens, either free of charge or at a very low cost. The canteens are supported mainly by public donations.

For indigent students' there is the King Alexander I Students' Home in Belgrade, which provides for the entire maintenance of some 500 students on payment of a small fee. The buildings of the home were erected by King Alexander I. The Ministry of Public Instruction provides an annual grant of 800,000 dinars for the cost of maintenance of the home, and the home is also in receipt of a monthly grant of 50,000 dinars for bursaries for poor students to pay for their maintenance.

At Belgrade, there are four students' canteens, at which 600 students are fed daily. At Zagreb, there are two canteens, at which 430 students are fed. At Ljubljana, the Students' Aid Society pays, in various kitchens, for the feeding of thirty-six students, while the banovine provides for twenty-five more. At Skoplje, the Students' Mess Society, aided by the professors and the inhabitants of the town, provides meals for needy students.

PROTECTION AND NUTRITION OF APPRENTICES AND YOUNG WORKERS.

Of the various private, official and semi-official associations concerned with the protection of young workers, the " Privrednik " societies of Belgrade and the " Hrvatski Radisa " society of Zagreb deal particularly with the improvement of nutrition.

The " Hrvatski Radisa " society has existed since 1903 and the " Privrednik " society since 1897. The latter has a home which can accommodate ninety to ninety-six apprentices, for whom their employers pay 300 dinars a month. Up to the present, 29,300 apprentices have received the hospitality of the " Privrednik ". At the present time, 4,000 apprentices are placed under the supervision of the society and have obtained work through its good offices.

Various proposals are being studied in order to ensure effective protection for apprentices, especially in their relations with their employers as regard food and clothing.

CHAPTER III.

MEASURES TAKEN ON BEHALF OF ADULTS, UNEMPLOYED, ETC.

The State usually recognises the obligation to provide for the physical subsistence for indigent persons and for sections of the population in temporary need of assistance. This work takes many forms, but the assistance given to necessitous families in the matter of food supply is of capital importance.

The growth of unemployment has in many countries led to the organisation of elaborate and costly measures for the relief and maintenance of families thus deprived of their normal means of livelihood. This relief often takes the form of distribution of food in addition to grants of money.

Argentine Republic

CANTEENS.

Certain institutions under the Central Authority run cheap canteens for workers ; there are nine of these canteens, and they are able to serve approximately 2,000 meals per day.

The canteens run by the Public Welfare Society are financed indirectly by the grants made by the Welfare Society to various institutions.

The canteens run by private organisations are of two kinds : those which supply food free of charge to persons who apply for it and those which supply it at a low price.

In Buenos Aires, there are twenty-six institutions which together distribute each day 1,736 free meals and 2,446 half-price meals, making a total of 4,182 meals per day.

Many large industrial establishments supply lunches (and, in a few cases, dinners) at cost price in the canteens attached to the workshops. As a rule, the cost of running these canteens is borne by the works. There are two types of canteens : canteens with fixed bills of fare and automatic bars ; among the latter, special mention should be made of the bar attached to the Anglo Cold Storage Establishments. As a general rule, the meals supplied by these employers' organisations are of excellent quality and the price charged is much less than their real value. It usually represents the cost of the raw materials and part of the cost of preparing and serving the meals.

There are, in the capital, sixteen organisations which together distribute each day 5,202 half-price meals and 395 meals which are fully paid for, making a total of 5,597 meals per day.

UNEMPLOYED.

There is a National Committee for Combating Unemployment (Law 11896) under the Ministry of the Interior ; since 1930, this Committee has given board and lodging at Puerto Nuevo to the unemployed who come there. It is at present assisting 2,500 persons in winter and 1,500 in summer.

Australia.

The State of New South Wales.

THE LIVING OR BASIC WAGE.

The essential pivot of the social machinery for ensuring satisfactory nutrition of the Australian population is the living or basic wage. The laws of the Commonwealth and of the separate States provide systems of industrial regulation of working-hours, conditions and wages, which cover employees working for daily and weekly wages, and also those employed at quite high rates of salary—for example, as high as £750 per annum in the State of New South Wales.

The wage rates of the industrial awards determined by the tribunals, and of the agreements made under their imprimatur, conform to the principle that the worker for wages shall not normally receive less than a living wage as calculated in terms of the Australian standard of living, account being taken of the sex and average family responsibilities of the worker. For example, wage rates in New South Wales for the building trades include an addition to, or a loading of, the living wage for unfavourable weather in the case of open-air workers, together with additions or "margins" for average skill according to the craft of the worker.

THE LEVEL OF NUTRITION.

The food or nutrition allowance is a primary element of the fundamental living or basic wage rates, below which no worker may be employed (except in rare cases under special permit issued on account of proved physical disability), the other primary elements of the living wage being shelter, clothing, fuel and light and miscellaneous requirements.

Examination of the cost of adequate nutrition of wage-earners has been conducted at frequent intervals since 1919 by the New South Wales industrial authority, which was the Board of Trade till 1926, and since that date the Industrial Commission. A parallel examination was made in 1920 by a Federal Commission of Enquiry, afterwards called the Basic Wage Commission.

The composition and energy value of the weekly dietary scales used to exemplify adequate nutrition for a family consisting of man, wife and three average children by the New South Wales Board of Trade in 1919 and by the Basic Wage Commission in 1920 are shown in Tables I and II.

On the basis of very lean meat (giving one calorie per gramme), the Board of Trade scale provides 3,600 calories a day for the man, 2,900 for the wife and 1,700 for the average child under 14 years of age, if the total consumption is shared according to Atwater's coefficients of the relative energy requirements of men, women and children; or 3,100, 2,600 and 2,000 calories a day for the man, wife and average child respectively, if the shares be allotted according to Lusk's coefficients, which are more generous for the children. Consumption of the same allowance by weight of lean or medium fat meat, instead of very lean

meat, gives 6% to 12% more calories, while reducing the protein allowances by 3% to 5%. Even so, the lowest daily protein allowance (derived by consumption of medium fat meat) is 115 grammes for the man, and the table shows that 45% of this is first-class protein.

The figures in Table I refer to foods as purchased by the consumer ; all refuse, such as bone, skin and parings, is allowed for in the computation of amounts of nutrients and energy value.

Table I. — NEW SOUTH WALES BOARD OF TRADE, 1919.

Composition and Energy Value of Weekly Dietary Scale for Man, Wife and Three Children.

	Quantity lb.	Amount of nutrients			Energy value Calories
		Protein lb.	Fat lb.	Carbohydrate lb.	
Bread	20	1.600	0.200	10.000	22,440
Meat :					
(1) Very lean ¹	16	2.720	0.432	—	6,880
or (2) Lean ²	16	2.480	1.696	—	11,760
or (3) Medium fat ³	16	2.368	2.896	—	16,640
Butter	1½	0.015	1.275	—	5,405
Oatmeal	3	0.483	0.216	2.025	5,580
Milk	18 ⁴	0.594	0.720	0.900	5,850
Sugar	4	—	—	4.000	7,440
Jam	1	0.010	—	0.500	945
Treacle	2	0.048	—	1.386	2,580
Rice	2	0.160	0.006	1.580	3,260
Peas	2 ⁵	0.492	0.020	1.240	3,310
Potatoes	14 ⁶	0.252	0.014	2.058	4,340
Raisins	1	0.023	0.030	0.685	1,445
Tea	½	—	—	—	—
Suet	1	0.047	0.818	—	3,540
Flour	4	0.532	0.060	2.908	6,660
Condiments	— ⁷	—	—	—	—
Fruit and vegetables	9 ⁸	0.117	0.036	0.972	2,160
Total in lb. (1) ¹	—	7.093	3.827	28.254	81,735
(2) ²	—	6.853	5.091	28.254	86,615
(3) ³	—	6.741	6.291	28.234	91,495

¹ On the basis of Atwater's analysis for very lean beef. As 1 kilogramme = 2.205 lb., approximately, the energy value of such meat is less than 1 calorie per gramme. This does not refer to item 2.

² On the basis of Atwater's analysis for lean beef. Energy value, 1.6 calories per gramme.

³ On the basis of Atwater's analysis for medium fat beef. Energy value, 2.8 calories per gramme.

⁴ Seven quarts is the quantity stated in the dietary scale. See *Bulletin of Living Wage (Adult Males)*, 1918, page 31, and Board's Declaration of October 8th, 1919.

⁵ Taken as dried peas.

⁶ 20% allowed for parings. If the potato is cooked in its skin, the energy value of 14 lb. is 5,600 calories.

⁷ Three pennyworth allowed in the dietary scale ; of little or no energy value.

⁸ Represents the sum of 2s. 6d., converted at about 3d. per lb. The analysis is for parsnips ; grapes, plums, beans, etc., have high energy values ; cabbage has a low energy ; the energy value of parsnips seems to be a rough mean for average fruit and vegetables.

Table II. — FEDERAL BASIC WAGE COMMISSION, 1920.
Composition and Energy Value of Weekly Dietary Scale for Man, Wife and Three Children.

Items	Quantity	Protein Grammes	Fat Grammes	Carbohydrates Grammes	Calories
Bread	20 lb.	726	108	4,762	23,520
Flour	3 „	157	14	1,020	4,953
Oatmeal	1 ½ lb.	110	49	460	2,787
Rice	½ „	18	1	179	816
Sage and cornflour	½ „	18	1	179	826
Eggs	1 dozen	81	65	—	922
Milk	7 quarts	270	317	397	5,688
Sugar	5 ½ lb.	—	—	2,444	10,230
Jam	2 „	5	1	452	1,890
Treacle	½ „	5	—	143	608
Butter	2 „	9	769	—	7,208
Beef ¹	8 „	550	521	—	7,100
Mutton	4 „	236	434	—	5,000
Fish	2 „	167	39	—	1,052
Bacon	½ „	22	136	—	1,173
Fruit (fresh)	8 „	18	7	435	1,928
Raisins	¼ „	3	3	90	407
Currants	¼ „	2	2	71	320
Potatoes	11 „	90	5	734	3,421
Onions	1 ½ „	3	1	37	174
Vegetables	8 „	33	8	147	800
Tea	½ „	—	—	—	—
Coffee	¼ „	—	—	—	—
Total per week	—	2,523	2,481	11,550	80,823
Per man per day	—	109	107	500	3,499

The New South Wales Industrial authority found that, in practice, the costs of the foregoing two dietary scales, although of slightly different composition, are usually and in the long run about equal. Hence they have been used indifferently as the basis of the nutrition allowances in the living wages, determined by the New South Wales tribunal for males and females, adaptation to families with less than three children being made by means of coefficients of relative energy requirements of men, women and children.

EMPLOYEES AND WORKMEN OF PUBLIC AUTHORITIES.

Public authorities, central and local, in employing labour, are subject to the same industrial laws as private employers.) For example, in the Arbitration Act of New South Wales it is specifically provided that wage-

¹ Mean of lean and moderately fat beef.

rates, hours, conditions of employment by the Crown and by such authorities as the Commissioner for Railways, the Water, Sewerage and Drainage Boards, whose powers are derived from the Crown, must not be less favourable to the employee than under the awards and agreements operative in private employment.

As these awards and agreements, being based on the living and basic wages, already secure adequate nutrition, it would be a work of supererogation for the public authorities, in their capacity of employers, to concern themselves directly with the nutrition of their employees.

UNEMPLOYED PERSONS IN RECEIPT OF RELIEF.

The Emergency Relief Work Scheme at present in operation in New South Wales provides for a scale of relief work for the benefit of unemployed persons, payments varying according to the "permissible income" from all other sources. The rates of payment for relief work have been based throughout the period of its operation upon the living wage for the time being operating in New South Wales, the current rates being referable to the present State living wage of £3 8s. 6d. The rates are as follows :

Classification	Fortnightly permissible income			Fortnightly relief work earnings			Total possible fortnightly earnings		
	£	s.	d.	£	s.	d.	£	s.	d.
Adult male (without dependents)	1	5	0	1	3	11	2	8	11
Man and wife	2	0	0	2	1	0	4	1	0
Man, wife and 1 child	2	10	0	2	11	3	5	1	3
Man, wife and 2 children	3	0	0	2	14	8	5	14	8
Man, wife and 3 children	3	5	0	3	1	6	6	6	6

It is clear that the fortnightly scale of relief earnings provides full nutrition according to the Industrial Commission's standard. Those who are unable to get any employment otherwise than on the relief works will probably suffer shortage of such requirements as clothing and miscellaneous items of normal expenditure, though this is, to some small extent, mitigated by periodic distribution of clothing and footwear by the Department of Government Relief.

OUTDOOR RELIEF (FOOD, CLOTHING, ETC.).

Persons in necessitous circumstances who are not provided for by any unemployment relief scheme above mentioned are granted food relief. The cost of this service to the New South Wales Government, at the present time, approximates £1,000,000 per annum. Generally speaking, any unemployed person who is registered for employment at a Government Labour Exchange may make application for food relief. It is not essential for applicants or their families to be absolutely

without income to become eligible for this form of assistance. Incomes varying with the family group are allowed, the present permissible amounts being as follows :

	Per fortnight	
	£	s.
Single person	1	5
Married couple	2	0
Married couple with 1 child	2	10
Married couple with 2 children	3	0
Married couple with 3 children	3	5

with an increase of 5s. per fortnight for each subsequent child.

A scale of relief appropriate to his family group is allotted to the applicant, and he is then required to indicate the names and addresses of his tradesmen—grocer, butcher, baker and milkman—and the various amounts he wishes to spend with each. Orders on the tradesmen to the extent indicated by the recipient are then posted to the tradesmen concerned, who subsequently present the orders to the Government for payment.

The value of the food relief provided varies with the size of the family. The appropriate scales and their values are as set out below :

	Per week	
	s.	d.
Single person	6	6
Married couple	10	9
Married couple with 1 child	16	9
Married couple with 2 children	19	9
Married couple with 3 children	22	9

plus 3s. for each additional child.

In order that the unemployed may receive full value for their food orders, a Departmental Committee periodically fixes the maximum prices which may be charged by tradesmen for the various foodstuffs. The food orders, in numerous instances, form a major part of tradesmen's businesses. They are eagerly sought, as, with the Government backing, there is no prospect of bad debts arising, and the orders can be turned into cash without delay. The orders may also be assigned to wholesalers and others, and, in practice, are very extensively so assigned.

Periodical distributions of boots and clothing are made to recipients of food relief and emergency relief workers.

RELIEF WORK OF PRIVATE ORGANISATIONS.

In view of the centrally operated living and basic wage systems plus child endowment, there is normally little room left for private charitable activities. Co-operative societies in Australia have no special association with nutrition. The friendly societies disburse sick pay, funeral expenses, etc., and a few trade unions pay unemployment

allowances for a limited period. But the activities of the Central Governments, State and Federal, outlined above, retard and make almost unnecessary the development of provision of "benefits" by such private associations. Indeed, the searching investigations made when determining the degree of eligibility of an applicant for employment or assistance under the Government relief work scheme tends to discourage decentralised mutual-aid associations.

Employers' associations, as such, are not concerned with the nutrition of employees. There is little room (certainly none in New South Wales) for family or child endowment schemes organised by employers such as are found in certain other countries. In New South Wales, the State system has covered this field since 1927.

The State of Victoria.

INDUSTRIAL WORKERS AND AGRICULTURAL LABOURERS.

No provision is made for an improved dietary for these classes of workers. Industrial workers are protected against under-nutrition by the legal provision of a minimum wage, and this wage is calculated to provide a reasonable standard of living for a man, wife and three children.

Agricultural labourers in the great majority of cases have their meals with their employer and his family and partake of the same food, so that the problem of under-nutrition scarcely arises.

UNEMPLOYED PERSONS.

Unemployed persons in Victoria are not issued food rations, but an allowance in money which enables them to purchase food according to their individual taste. The payments are on a definite scale—the minimum allowance is for single men, married men receiving an extra grant for their wife and each child. In cases of hardship through special family circumstances, sickness, etc., religious and philanthropic societies supplement the official grant with orders for milk, groceries, etc.

The Federal Capital Territory.

The population of the Federal Capital Territory in 1933 was 8,947. The administration of the territory is under the jurisdiction of the Minister of the Interior, assisted by a partly elected and partly nominated Advisory Council, the Department of the Interior employing most workers who are not permanent public servants. This department works in unison with the Canberra Relief Society, the expenditure of which is subsidised by the Government to the extent of two-thirds (over the past five years).

INDUSTRIAL WORKERS.

Award rates are payable to industrial workers in the territory, these being more than sufficient for an adequate diet, when permanent work is available, except in certain instances. Where the employee has a very large family and is unable to provide sufficient food of the right

type, assistance is granted by the Canberra Relief Society. When permanent work is unavailable, these employees come under the heading of intermittent relief workers.

UNEMPLOYED PERSONS IN RECEIPT OF RELIEF.

The Department of the Interior provides work for the unemployed to the extent of at least one week in three for married men, and one week in five for single men. At Christmas and midwinter, about a month's regular work is provided. For those unable to work, ration orders are given for an adequate, well-balanced diet for non-workers. Butter and, except in the case of single men, milk orders are given in all cases. Recipients may substitute certain foods at their discretion, and vegetable seeds may be purchased.

If for any reason a person's income for the previous four weeks is below a certain fixed amount, which varies with the size of the family, then extra work is granted to the value of the appropriate ration scale, and payment is made in cash. These amounts are as follows :

Married couples :	£	s.	d.
With or without one child	4	0	0
With 2 or 3 children	5	4	0
With 4 children	6	6	0
With 5 children	7	9	0
With 6 children	8	10	10
With 7 children	9	15	0

The State of Western Australia.

There is evidence that, in Western Australia, single men on sustenance show a fair proportion of individuals who have suffered and are suffering from malnutrition, probably because in many cases they have had to prepare their own meals and provide for themselves, with the result that meals have been prepared in a haphazard way without due regard to a proper choice of diet and with a view to the saving of trouble in preparation. This has resulted in an undue number of cases which have become more or less unemployable by reason of chronic gastric trouble, duodenal ulcer, and other evidences of malnutrition.

Luncheon-rooms are provided for employees at a certain number of large emporiums and Commonwealth Departments, probably with distinct advantage.

The State of South Australia.

The Central Board of Health reports that it has no evidence to indicate that certain parts of the population are under-nourished. The scale of rations issued to unemployed and their families is regarded as a high one and under such conditions there should be no likelihood of under-nutrition occurring. Further, statistics do not indicate any mortality or morbidity arising as a definite result of under-nutrition.

The following is the scale of rations issued to unemployed :

Relief for one week for an adult :

Groceries	2/5.
Bread	3 loaves.
Meat	3 ½ lb.
Vegetables	6d.

Relief for one week for a married couple :

Groceries	4/10.
Bread	6 loaves.
Meat	7 lb.
Vegetables	1/-.

Relief for one week for children :

All individuals over their thirteenth birthday: Full adult ration.

Children over 9 years and up to 13 yrs of age :

Meat	2 ½ lb.
Bread	3 loaves.
Milk	3 ½ pints.
Vegetables	3d.
Groceries	2/1.

Children over 6 years and up to 9 years of age :

Meat	2 lb.
Bread	2 ½ loaves.
Milk	3 ½ pints.
Vegetables	3d.
Groceries	1/9.

Children over 3 years and up to 6 years of age :

Meat	1 lb.
Bread	2 loaves.
Milk	7 pints.
Vegetables	3d.
Groceries	1/5.

Children from first birthday up to three years to age :

Meat	½ lb.
Bread	1 loaf.
Milk	7 pints.
Vegetables	3d.
Groceries	1/3.

Nursing mother to receive 1 ½ pints of milk per day in addition to her usual ration, until the baby is weaned.

Babies artificially fed up to the age of 6 months to receive 25 ounces of milk per day, 1 ¼ ounces of sugar, and orange juice to the value of

$\frac{1}{2}$ d. per day. From 6 months to 12 months, 1 $\frac{1}{2}$ pints of milk per day and 1d. per day for fruit and vegetables, $\frac{1}{2}$ lb. sugar and $\frac{1}{2}$ lb. some cereal per week.

At the end of February 1936, there were 10,000 males, 5,000 females and 9,000 children being issued with rations.

Austria.

THE " WINTER AID " FUND FOR THE RELIEF OF NECESSITOUS FAMILIES.

The large-scale campaign which the Federal Government has been conducting for several years with a view to assisting the needy sections of the population during the winter (" Winterhilfe der Bundesregierung ") is closely associated with the problem of nutrition.

Thus, in the Federal capital, Vienna, needy persons whose hardships are accentuated by the winter are supplied by this means with food and means of protection against the cold. Distribution during the season 1934-35 was as follows :

Supply of Foodstuffs. — The expenditure was 2,067,244.20 schillings. The quantities of food supplied were :

1,043.300	tons of flour ;
521.650	tons of sugar ;
260.825	tons of vegetable fat ;
521.650	tons of beans.

Orders for Meals. — 136,027 books of food coupons for 1,654,822 meals were issued. On an average, 14,800 persons were fed daily.

Breakfasts. — Meals were supplied for children consisting of a quarter of a litre of cocoa and milk and 15 decagrammes of rye bread ; 200,104 quarter-litres of cocoa and milk and 66,517 loaves of bread were issued. By this means, 13,400 children on an average were given a hot breakfast daily. In 1936, the number of schoolchildren rose to 22,000.

Tinned Food. — In 1934-35, 127,400 tins of *gulyás* were issued under the auspices of the Vienna " Winter Aid " Fund.

Free Milk Distribution. — Parents with one child, mothers who were the sole support of one or two children, aged persons, invalids, expectant mothers and convalescents, if suffering special hardship, receive from the Welfare Office milk coupons (half a litre per head). Altogether, 50,000 coupons are issued monthly.

Among the large-scale activities carried on in Vienna by private organisations all the year round may be mentioned :

The foodstuffs, midday meals, and " convent soup " distributed by the " Caritas " Institute of the Archbishopric of Vienna and its affiliated convents, associations and organisations.

The "Josefstische", which supply needy adults with hot meals to be taken home and which are shared by the children also. About 24,000 persons are served daily by this agency.

The "Elisabethtische". This organisation supplies hot meals, particularly to the destitute middle-class. According to the 1934-35 report, the beneficiaries number 5,960.

In addition, some 700 organisations, societies and authorities make large-scale distributions at Christmas.

Similar practical efforts are made in Upper Austria, partly through the "Winter Aid" Fund in the case of persons receiving relief, and partly through school milk schemes in the case of schoolchildren. Most of the school centres in the province have soup-kitchens, which furnish a nourishing hot meal to schoolchildren having a long journey to school and therefore being unable to return home at midday for a meal.

The "Winter Aid" Fund in Upper Austria supplied large quantities of foodstuffs free of charge or at reduced prices to persons in receipt of relief, while the value of the foodstuffs distributed by various agencies in the province amounted to 140,000 schillings. In principle, relief was given in the form of local produce bought out of the money received. First place was taken by periodical issues of food parcels or daily supplies of food.

The City of Linz Welfare Office distributes additional food weekly in the city itself to persons in receipt of relief, and during the winter months about 1,200 children are fed four times a week at ten municipal soup-kitchens. They receive cocoa, vegetables or thick soup. There is, in addition, a scheme for the supply of free milk to various schools which distributes daily, free of charge, a quarter of a litre of hot milk as a morning meal to 2,000 schoolchildren.

In the Province of Salzburg, arrangements exist for supplying infants and schoolchildren with pure milk. For the mothers themselves, however, only limited provision is made to the extent of the help afforded by maternal welfare centres. The working population is, by means of the "Winter Aid" schemes, given fairly generous help, particularly in Salzburg; unmarried and childless couples receive a copious midday and evening meal, while married persons with children are issued food parcels.

In Styria, the Maternal Welfare Department of the Fatherland Front now arranges for better food for mothers by the issue of food allowances to needy women one month before and one month after childbirth. The allowances consist of parcels of flour, fat, rice, groats and sugar, and also of tinned foods and free milk cards.

In general, efforts have for years past been made to improve the food of infants and children by supplying helpful advice through the Public Health Centres. In Styria, this action is conducted on uniform lines and at the present time embraces about 80% of the total population. Parallel action is taken in the provinces of Tyrol and Vorarlberg.

United Kingdom.

The allowances made by the Unemployment Assistance Board to unemployed persons within the scope of the Unemployment Assistance Act are normally made in the form of cash, and recipients are generally free to spend their allowances as they think fit. Allowances may be increased where the need for extra nutrition is proved. In cases of difficulty where the allowances granted are being misapplied, the Board exercises its powers to pay the allowance partly in kind, so as to ensure that a due proportion is devoted to food.

The Board is represented on the Advisory Committee for Nutrition and is also in touch with other departments on matters which arise from time to time—*e.g.*, in connection with the disposal of surplus foodstuffs to the lower-paid and unemployed industrial classes.

In England and Wales, outdoor relief is afforded by local authorities in accordance with the provisions of the Poor Law Act, 1930, and the Relief Regulation Order, 1930. This relief is given either in the form of cash payments, enabling the persons applying to provide a sufficient amount of suitable food for themselves and their dependents or in the form of orders on tradespeople.

It may be said generally that, in dealing with applications for outdoor relief, the authorities pay particular regard to the need for extra nourishment in special cases.

In Scotland, with regard to persons, including able-bodied unemployed persons, who apply for poor relief, the statutory duty of the local authority is to provide needful sustentation. Needful sustentation is not defined by statute and, in practice, the interpretation of these words has varied from time to time in the past with changing standards of living among the population as a whole. Local authorities, in affording needful sustentation by way of outdoor relief (*i.e.*, relief in cash or, rarely, in kind), aim at giving sufficient to enable the applicant and his dependants to maintain health and enjoy reasonable comfort. In granting outdoor relief, however, no conditions are laid down as to the methods of its disbursement. The local authorities have special regard to cases where there is exceptional need, and allowance would always be made in respect of extra or special nourishment certified by the authority's medical officer to be necessary.

Czechoslovakia.

RELIEF OF UNEMPLOYMENT.

Unemployment in Czechoslovakia is still at the same level as in 1933. At the end of 1935, there were 700,000 unemployed, but any tendency to increase has been checked by capital expenditure and productive relief measures for the benefit of the unemployed. These measures can be divided into three main groups :

(1) General productive measures for the benefit of the unemployed, consisting of State subsidies to public building contractors ;

(2) " Territorial " action, consisting of loans or subsidies for large-scale works which are already being subsidised out of other public funds ;

(3) Subsidies granted to public utility institutions for works involving capital expenditure.

The total amount granted for productive relief work for the benefit of the unemployed is 126 million crowns. This has enabled autonomous administrations, public utility institutions and State undertakings to carry out work costing over 1 milliard crowns, and to give employment to nearly 200,000 persons.

The execution of public works has an indirect influence on the nutrition of the unemployed, who once again become producers and consequently consumers, since they are in receipt of a regular income. A similar result is obtained by subsidies for housing. To enable the largest possible number of unemployed workmen to be engaged, fiscal facilities are granted for the repair or rebuilding of old houses and State subsidies for the construction of new ones.

Direct measures to improve the nutrition of the unemployed may be divided into nine groups :

1. State measures for feeding the unemployed come first. Unemployed persons not entitled to unemployment benefits under the Ghent system, towards which the State grants a subsidy, receive a weekly allowance of 20 crowns if they are fathers of a family and 10 crowns if they are unmarried. Although this allowance is not large, it has placed an enormous burden on the State. In 1933, 237,905,300 crowns were expended ; in 1934, 212,587,150 ; and, in 1935, 284,431,420.

2. The distribution of milk to children of the unemployed and fathers of families in part-time employment ; in so far as funds permit, every child receives half a litre of milk per day. This quantity is distributed to all children whose fathers are unemployed, even if the latter are in receipt of some other unemployment benefit. The milk is bought in various districts at different prices. For the last three years, 1933-1935, the average purchase price was 1.40 crown. In 1933, the expenditure involved was 22,200,000 crowns, and 15,860,000 litres of milk were purchased. In 1934, the outlay was 27,500,000 crowns, and approximately 19,643,000 litres of milk were purchased. In 1935, the expenditure was 29,622,000 crowns, and approximately 21,158,700 litres of milk were purchased.

3. These State measures for feeding the unemployed are supplemented by the distribution of bread, which is made in the districts where there is most unemployment. Unemployed persons

in these districts who are entitled to State relief obtain—if they have a family—two loaves a week, each weighing 1.5 kg. Unmarried persons obtain one loaf a week. In 1935, this distribution involved an expenditure of 6,512,465.05 crowns; in 1934, 34,280,619.45 crowns; and, in 1933, 58,725,896 crowns.

These three relief measures have been applied continuously since 1931. The beneficiaries obtained their rations in bulk at intervals of five weeks.

4. Each winter the unemployed receive a supply of coal which is either bought by the State or given to them by the colliery owners. During the winter 1935-36, 1,900 truck-loads of coal were distributed free of charge to the unemployed.

5. Funds are granted each year by the Government for "Christmas relief", to which unemployed persons and part-time workers who are fathers of families are entitled. Before Christmas, these persons receive warrants for foodstuffs, which are distributed by the Unemployed Food Relief Service. Persons with one or two children receive warrants representing a value of 20 crowns; persons with three children, 30 crowns; and persons with four or more children, 40 crowns. In 1935, 6 million crowns were expended for this purpose.

6. Clothing is distributed in winter to the children of the unemployed and to partly employed persons who are fathers of a family. The expenditure amounts to 3 million crowns per year.

7. A sum of 2 million crowns, which was later increased to 3 millions, has been provided for feeding the children of the unemployed in winter. This service is run by the State and was inaugurated in 1935.

8. Since 1933, a sum of 5 million crowns a year has been allocated for the purpose of supplementing communal relief to the unemployed.

9. Winter relief for the unemployed was introduced during the winter 1935-36. A sum of 54 million crowns has been appropriated for this purpose. This exceptional relief takes the form of the distribution of foodstuffs in kind to the unemployed living in districts where there is most unemployment and who are entitled to relief out of the State Fund for Feeding the Unemployed. These include young persons over 16 if the breadwinner of the family is not in regular employment; persons in receipt of unemployment benefit under the Ghent system, when the State allowance does not exceed the value of the foodstuffs granted by the State Fund for Feeding the Unemployed; seasonal workers who were unemployed for half the season during the previous year or who have been out of work for three consecutive months. The foodstuffs distributed were: 16,518

quintals of fat, 41,409 quintals of flour, 13,586 quintals of sugar, 21,865 quintals of hulled barley and 8,236 quintals of barley coffee ; lastly, 3,175 truck-loads of potatoes were distributed to unemployed persons.

In the case of benefits granted to the unemployed under the Ghent system, the State subsidy amounts to nearly twice as much as the subsidy paid by the trade union. The following sums were paid to the unemployed under this system :

Year	Crowns
1931.	201,850,912.75
1932.	365,724,694.45
1933.	535,098,746.00
1934.	309,887,628.45
1935.	300,557,170.00

Denmark.

Danish social legislation provides for financial assistance to all sections of the population that are in want on account of unemployment, illness, etc., and thus ensures that the population as a whole is at all times able to obtain the foodstuffs necessary for the maintenance of life.

Estonia.

In Estonia, assistance, in the form of food, for minors, unemployed persons incapable of heavy manual labour and indigent unemployed persons capable of work was carried out by nutrition centres serving one hot meal a day, or distributing foods in the dry state weekly. In 1931-32, relief in this form was given to 6,837 minors and unemployed persons incapable of heavy work, and to 9,747 unemployed persons capable of work. The corresponding figures for 1932-33 were 7,670 and 15,327 respectively.

As unemployment declined, the feeding of the indigent unemployed was suspended. Persons who had fallen into indigence as the result of unemployment were assisted through the sale of rye from the State granaries to the communal administrations at 50% below market prices. The communes were free to distribute this rye in the form of relief to assisted persons, or to sell it at low prices to the unemployed and to indigent persons unable to buy rye at market prices ; 3,257 tons of rye from the State granaries were sold in this way.

Finland.

In Finland, all the big employers now see to it that food is obtainable at reasonable prices, even in the remotest spots by men engaged in timber felling and floating. The law on the housing of lumbermen requires the employer to provide a cooking-stove in the huts. Two of

the largest companies in the timber industry have decided to help their employees by establishing eating-houses and providing a cook and the necessary equipment.

In recent years, the special inspector of the Ministry of Social Affairs has devoted great attention to the question of the provision of food for men working in the forests, and has compiled statistics of the prices of the foodstuffs most commonly used by timber-workers in different parts of the country.

The rules of the public assistance institutions, which have to be sanctioned by the prefects, prescribe that every institution must have a diet-sheet framed jointly by the management of the institution and the visiting doctor. The district public assistance inspectors, who are appointed by the Government, see that the institutions adhere to their diet-sheets and exercise general supervision over the dietary.

The out-relief provided by communal Public Assistance Boards is often given in kind, in the form of food ; otherwise in cash.

In all these activities, the communal Public Assistance Boards are required to observe the general rule laid down in Section 1 of the existing Public Assistance Act—namely, that the applicant must be given whatever maintenance and care he needs.

France.

The public authorities are fully empowered not merely to supervise, but to guide dietary practice in connection with certain very diverse and large categories of the population—soldiers and sailors, school-children and persons in receipt of relief in public institutions.

In these circumstances, the authorities concerned should not encounter any great difficulty in applying to these various categories of the population any more rational dietetic methods.

On the other hand, there are certain equally numerous categories whose diet is not yet governed by any special rules, in particular, persons benefiting under social insurance schemes and the unemployed.

It is proposed to consider what steps may be taken to improve the diet of these persons both in quantity and quality.

THE NUTRITION OF PERSONS BENEFITING UNDER SOCIAL INSURANCE SCHEMES.

The number of assured persons in France is at present 8,800,000. In view of its magnitude, the question has been raised whether it is possible under existing regulations to exercise a guiding influence on the diet of these persons.

Neither the Organic Law of April 5th, 1928, on Social Insurance nor the texts for the application of that law make any specific reference to the nutrition of insured persons. The fund has, however, very wide

powers of guardianship, in that insurance covers the risks of illness, invalidity, old age and death and takes into account family-charges and maternity.

Very important benefits are accorded to mothers. One of these is in connection with the feeding of the child. Under Article 9, § 5, of the Decree-Law of October 30th, 1935 :

“ An insured woman who is duly certified by the medical officer to be incapable through physical incapacity or disease of feeding her child at the breast may, if the child is brought up by her in her own home, be granted, for the period and to the extent indicated by the doctor, coupons for milk the value of which shall not in any circumstances exceed 60% of the bonus for breast-feeding.”

These provisions show that the social insurance funds can take certain action in connection with the nutrition of their insured persons. Could not the following paragraph be interpreted in the same way ?

“ An insured person or person entitled to benefit whose state of health necessitates preventive care or who is suffering from a disease that does not incapacitate him for work shall be granted, if necessary, for a period not exceeding two years, special benefits, the maximum amount of these and the conditions under which they may be granted being defined by the internal regulations of the fund.”

In whatever way these texts are interpreted, it is a recognised fact that the various funds must endeavour to prevent sickness amongst their insured persons. Should not an adequate and rational diet be regarded as one of the essential factors of such protection ?

The regional unions of the distributing funds are responsible for the organisation and prevention of sickness among their insured persons.

These unions are in process of formation (their creation was prescribed by Decree-Law of October 30th, 1935).

The Directorate-General of Social Insurance will draw the attention of these unions, as soon as they have been established, to the part played by nutrition in the prevention of disease.

Thus, methods by which the diet of persons benefiting under social insurance schemes may be improved both in quantity and quality will be carefully studied. These studies will probably lead to practical conclusions of the highest interest.

NUTRITION OF THE UNEMPLOYED.

It is a known fact that unemployment has not been so serious in France as in certain other important countries. The number of unemployed is about 300,000. This figure is, however, high enough to have warranted the adoption of special measures to assist this part of the population.

In this connection, the State has only intervened indirectly. Unemployment funds have been established in the various departments

and communes, the State merely contributing, under conditions laid down in a Decree of December 28th, 1926, to the expenditure contracted by these communities. At law, the unemployed are entitled only to a relief grant. In principle, these grants are not necessarily made in the form of money ; they may be in kind—in the form of meals, for instance. But, in point of fact, the unemployment funds rarely avail themselves of this option.

Several funds adopted the system of distributing the total amount of the grant in the form of food coupons ; but this gave rise to various malpractices, such as the sale of the coupons by the unemployed, so that the Ministry of Labour does not encourage this form of relief.

The Central Administration does not advise the distribution of foodstuffs, on account of the difficulty of supervision and the possibility of fraud. Moreover, it is feared that such distribution might place unemployed persons in an excessively favourable position as compared with employed persons.

These few details show that the official unemployed relief organisations do not give thought to the nutrition of the unemployed. Certain communities, however, such as the city of Paris, in addition to numerous supplementary optional benefits, grant to their unemployed certain benefits in the matter of foodstuffs.

For instance, a decision of the municipal council of March 30th, 1931, lays down that the children of unemployed persons shall be admitted free of charge to elementary-school canteens. The city of Paris also allows unemployed persons to take their meals in the " people's soup-kitchens ".

On the other hand, most of the numerous private organisations engaged in assisting the unemployed distribute foodstuffs, raw or prepared food (meals or soup, to be eaten on the spot or taken away).

It would seem, therefore, that, as matters stand, action with a view to improving the nutrition of the unemployed in France must be taken through the intermediary of the private organisations, unless a more detailed study of the question reveals the necessity of inviting the public authorities to reconsider the desirability of distributing relief in kind to the unemployed.

Hungary.

In Hungary, in recent years, many factories have set up kitchens and canteens in order to improve the nutrition of the workers. At midday and in the evening, these canteens provide meals at cost, the price being roughly equivalent to an hour's wages.

Mine-workers are still more fortunate in that these enterprises have shops in which the workers can buy foodstuffs and clothing at reduced prices by means of vouchers. Further, the miners live for the most part in workers' colonies where they can raise cows, pigs and poultry.

Both the mines and the factories organise courses in domestic economy for the women workers.

Italy.

ASSISTANCE TO THE UNEMPLOYED AND TO POOR FAMILIES.

In Italy, apart from certain special institutions for the relief of particular classes of individuals (the aged, the sick, orphans, etc.), the public authorities have for some years now given assistance to certain classes of the unemployed or indigent families, *inter alia*, in the form of food.

The "Ente Opere Assistenziali" (Institution for Relief Organisations) of the Fascist Party, or, as the case may be, the insurance institutions, look after unemployed persons and all persons who for any reason find themselves in a situation which justifies the granting of relief. In winter-time, soup kitchens are set up in several towns, which give one meal a day to persons whose circumstances entitle them to receive it. The composition of these meals was investigated by the Committee for the Study of Problems of Nutrition of the National Research Council. They were found to be equivalent generally to about 1,300 calories. The Party thus supplied each unemployed person and each member of his family with about one-half of the amount of energy needed by them per day.

Assistance is given on the strength of the relief vouchers issued by the F.P.R.O.A. to the heads of indigent families, and is based on tested rules of hygiene and physiology, without at the same time overlooking the equally important factors of local custom and the most suitable dietary.

STATISTICS OF RELIEF WORK.

In 1933, the Relief Organisation, which co-ordinates the work of all the previous existing organisations by increasing their resources and developing their action, assisted on an average 2,328,924 persons daily. In the same year, it distributed 46,333,335 meals through soup kitchens and, in other forms, supplied 72,218,536 food rations in kind and 4,813,981 litres of milk. For 1934, when 2,884,000 persons on an average were assisted daily, the statistics are more complete :

Soup kitchens :

Bread and soup (rations distributed)	33,286,148
Meat and vegetables (rations distributed)	1,322,122
Milk (cups)	1,790,417

Food distributed in kind :

	Rations distributed
Wheaten flour	12,556,674
Maize flour	10,564,213
Bread	29,204,425
Alimentary pastes	13,701,912
Vegetables	17,128,811
Rice	13,883,420

	Rations distributed
Bacon	7,781,171
Tomato sauce	2,950,452
Meat	890,186
Potatoes	4,087,610
Oil	4,168,696
Milk	5,263,598
Sugar	757,866
Eggs.	217,508
Coffee	186,662
<i>School meals</i> (rations distributed).	9,347,473

ASSISTANCE GIVEN BY INSURANCE INSTITUTIONS.

The Social Welfare Institute, which administers all social insurance except accident insurance, has drawn up for the various classes of assisted persons charts laying down the food ration. Special charts have, similarly, been drawn up for the sanatoria managed by the Institute.

WORKERS' CANTEENS.

Another innovation is the workers' canteen, which enables workers to obtain an ample and well-prepared hot meal at a very low cost served during the midday interval in appropriate and comfortable premises. Workers are thus enabled to recover the calories necessary for further productive work.

These canteens are to be found in almost all large and medium-sized undertakings, some of which themselves issue hot soup at their own cost. Other canteens, on the other hand, are almost entirely managed by the local workers' union. Such, for example, is the case of the canteens of the General Electricity Company at Milan or the harbour workers at Genoa.

HOSTELS.

Other industrial undertakings—particularly textile firms—have introduced hostels for young workers of both sexes whose families have no relatives in the place where they work. At these hostels, they receive three meals a day, prepared in accordance with an appropriate dietary, the cost of board and lodging being very low.

On the advice of the factory doctor or social assistant, the managements of certain firms have rations of milk, eggs and chocolate distributed each day to working-girls and young women in delicate health and to mothers nursing their infants in the factory nursery.

Latvia.

**INFLUENCE OF GOVERNMENT MEASURES AGAINST UNEMPLOYMENT
ON THE CONSUMPTION OF FOODSTUFFS.**

The decline in the prices of agricultural products, both on the world market and within the country, resulted in a material reduction in the income and purchasing power of the Latvian farmer in 1931 and 1932. As farmers and their families form half the total population of Latvia, the decline in their purchasing power has had a considerable influence on industry, trade and the other branches of the economic life of the country. Hence, industrial, commercial and transport undertakings have been obliged to curtail their activities and to dismiss part of their employees. For this reason, the number of workers insured with the sickness insurance funds¹ declined from 180,000 in 1930 to 141,000 in 1932.

In order to relieve unemployment, the Government organised public work (preparation of timber in the State forests, levelling of the ground for road construction, work on the railways, etc.). The organisation of these public works entailed the following expenditure on the part of the State and municipalities : 9.8 million lats during the financial year 1932-33, 8.9 million lats in 1933-34, and 7.3 million lats in 1934-35. Grants were also made to unemployed women having small children and to other categories of unemployed.

Among the Government's various activities in the campaign against unemployment, special mention should be made of its efforts to employ the workers in industry and in certain other branches. It is thanks to Government intervention that industry was able to extend its activities and thus to increase the number of employed workers. This was achieved by the Government's agrarian policy, which guaranteed farmers fixed prices for their products and gave them a stable and a wider market. In this way, the income and purchasing power of the farmers increased, which had a favourable effect on industry, commerce and other branches of economic life. The Government's industrial policy also contributed to the development of industry. By the limitation of imports of industrial products (the quota system), local industry was enabled to produce a whole series of articles which before were wholly or for the most part imported from abroad.

The steps taken by the Government in the agricultural and industrial fields have led to the complete disappearance of unemployment in Latvia. Towards the end of 1935, the sickness insurance funds included 181,000 insured workers, or about the same number as before the economic depression, as compared with 145,000 at about the end of 1932—*i.e.*, three years ago. Hence, during this period, the number of wage-earners increased by 36,000. The income of these 36,000 newly

¹ All wage-earners are insured with these funds, with the exception of farmers and public officials.

employed persons may be estimated at 35,000,000 lats (the average wage of industrial workers of either sex is approximately 1,000 lats per annum). With the members of their families, the newly employed persons total about 60,000, whose consuming power has considerably increased. This accounts for the increase in consumption of foodstuffs in the towns of Latvia.

IMPROVEMENT IN THE LIVING CONDITIONS OF AGRICULTURAL WORKERS.

Thanks to Government action to increase agricultural production and protect agriculture, the situation of Latvian farmers has considerably improved in the last few years. The cultivation of cereals and of sugar-beet and flax having greatly increased, new opportunities of employment are being provided, leading to a rise in the wages of agricultural workers. At the same time, the farmers, whose income has increased thanks to the stabilisation of prices and the extension of marketing facilities, are well able to pay higher wages. Thus, the situation of the agricultural workers has greatly improved, and the same applies to their nutrition.

IMPROVEMENT OF NUTRITION IN LATGALE.

The region of Latgale, which has about 500,000 inhabitants, possesses certain special economic features, since its historical past has not been the same as that of the other districts of Latvia. At the time of the formation of the Latvian State, the land was divided into numerous scattered lots, which enormously complicated its cultivation. Until recently, the number of illiterate persons was considerable (a large percentage of the population is of Russian and Polish nationality).

The rural population of Latgale is approximately twice as dense and the birth rate there is much greater than in the other regions of Latvia. Agricultural technique is much less developed there than elsewhere. Accordingly, agricultural production in Latgale was at a very low level, and the consumption of foodstuffs per head was materially less than in the other districts. This applies particularly to meat and dairy products. Nevertheless, the last five or six years have brought improvements to this part of Latvian territory also. The agrarian reform divided the village lands into individual holdings and established numerous new farms on ground previously belonging to large estates. In this way, the agrarian structure has become much more rational and the Latgalian farmer has had full scope to develop production and thus increase his income. The State has spent large sums on raising the level of education, and already the number of illiterate persons has materially decreased. Large sums have also been spent in the form of loans to farmers.

Thanks to all these measures, agricultural production has materially increased in Latgale. The total rye crop, as compared with that of the

pre-depression years, has increased by about 50%, while the percentage increase in the wheat crop has been still greater. The output of animal products—meat and milk—also shows a considerable increase. The consumption of foodstuffs in Latgale has accordingly improved considerably.

Poland.

In Poland, the fundamental law on public assistance of September 1923 makes the communes responsible for maintaining all necessitous persons unable to provide for their own needs. This obligation extends to all persons having resided not less than one year in the commune concerned. It is this fundamental law which is the basis of all measures of assistance adopted by the Ministry of Social Assistance and executed by the communes and local authorities subordinate to it.

Persons receiving assistance under this law are examined by the authorities from the social, economic and frequently medical points of view. Assisted persons are everywhere found to be in a state of under-nutrition. Their numbers are considerable. At Warsaw, in 1933, they numbered approximately 80,000 (20,000 families), or 7% of the population. The state of under-nutrition is detected either by the medical services (doctor, visiting nurse) or by the assistance service (social workers).

The nutrition measures which form part of social assistance are in the hands of the autonomous authorities, which keep in touch with the social organisations.

As an example may be mentioned the work of the autonomous administration of the city of Warsaw.

The centres issue cards entitling the holder to various benefits. The principal forms of assistance in the matter of nutrition are : (a) meals, (b) distribution of bread, (c) distribution of milk and cod-liver oil for children.

Apart from direct nutrition, families to be assisted receive money grants, the greater part of which is obviously spent on improving the dietary.

Meals consist of meat soup, with vegetables and bread. The price per meal is about 52 grosz for intellectual workers and about 23.5 grosz for physical workers. During the budgetary year 1934-35, 966,800 meals were provided for 21,522 persons. The bread is baked by the mechanical bakery of the town and is distributed to the persons indicated by the centres. There is no distribution of flour.

The Labour Fund Law of March 19th, 1933, enacts that " the purpose of the Labour Fund is to supply work or the means of livelihood to the unemployed who have no other way of earning a living, chiefly by the organisation of public works or works of public importance ".

The Labour Fund, which has a much larger budget than the institutions above mentioned, and at the same time has such permanent sources of income as the special taxes on salaries and wages, consumption,

etc., can conduct a much more methodical campaign against unemployment taken as a whole and for a protracted period.

Primarily in accordance with the stipulations of the law, the Labour Fund, in principle, regards it as necessary to provide for the unemployed by means of public works. But it could not disregard immediate assistance in the shape of food and fuel, as (1) such relief was less expensive; (2) public works could only be conducted on a very limited scale in winter, owing to weather conditions, and winter is precisely the hardest time for the unemployed.

The Labour Fund spent the following amounts from 1933-34 to 1935-36 on organising work and relief:

	1933-34	1934-35	1935-36 (estimates)
	(In thousands of zloty)		
Public works	49,891	81,638	88,400
Immediate relief.	32,088	19,664	17,500

The credits used by the Labour Fund were supplied to it either in cash or in the form of certain articles of food sold in bulk, for which central purchasing had to be resorted to. In this way, big reductions were obtained on the purchase prices. Coal and sugar were the chief of these articles.

The Labour Fund issued only general organising instructions; the actual relief was given by the Labour Fund's local committees. Close collaboration with the local population enabled the voivodeship committees to secure, in addition to the budget appropriations, large sums by organising street collections and other public demonstrations. The actual funds thus collected by committees amounted, in 1934-35, to 11,720,000 zloty, which brought the cost of immediate relief in that year to the aggregate amount of 31,366,000 zloty. Collections made from the local, and particularly the agricultural, population brought in numerous gifts of food, such as potatoes, cereals, etc.

The immediate relief organised by voivodeship committees in 1934-35 was extended to a number of persons (unemployed and members of their families) varying between 445,000 in August 1934 and 828,000 in March 1935.

In addition to articles of food, the unemployed received, particularly in winter-time, certain amounts of coal and wood, and, in some isolated cases, clothing, underclothes, soap, medicine, etc. The relief given in the form of food, however, was more than 90% of the total immediate relief given.

The average expenditure monthly on immediate relief was 20 zloty per family. This is, of course, a small figure; but, as large savings were made in purchasing the products and relief was limited almost entirely to the distribution of food, it was possible with this amount to give the unemployed sufficient supplies to tide over the most critical period of unemployment.

Sweden.

In Sweden, the official activity for rendering aid has mainly been so organised as to secure, by the organisation of public works, an income for the unemployed person large enough to procure for him a barely adequate living. In cases where aid cannot be arranged in this way, assistance is given in cash or in kind, or in both. Assistance in kind is sometimes given in the form of one or more meals per day. Nutritional control of these meals hardly ever takes place. In certain particularly stricken areas, the Government has also resorted to the distribution of food rations direct to necessitous persons. Unemployment having been considerably reduced during the last years, unemployment assistance is seldom now given in kind.

Meals to persons under the care of the public assistance authorities are supplied by the municipal authorities, which exercise such control as they deem necessary.

Extensive aid to necessitous persons is rendered, in the form of free meals, by private or semi-private institutions, such as the Salvation Army and other welfare institutions.

Switzerland.

In Switzerland, certain municipalities have set up kitchens for unemployed and indigent persons, in which necessitous families and individuals are given three free meals a day. The equipment and the food are supplied by the municipalities, which appoint the responsible staff. The kitchens of the city of Lausanne, for example, distributed 196,926 meals in November 1935.

In many Swiss towns, there is a private organisation, approved by the authorities, for temporary relief, which is known as the " Kilo Week " or " Le Kilo du Chômeur ". At certain times, groups of philanthropic workers make a general round of the population, collecting any gifts in cash or in kind which they can get. The gifts are sifted and inspected by the Public Health Service before being distributed, as and when required. This organisation has made it possible to make very considerable distributions of food, groceries, vegetables, potatoes, etc.

A whole group of philanthropic organisations is concerned with the distribution of food. The work varies in importance and character from one place to another. Frequently, it is not confined to the distribution of food ; but, under different forms and different names, the objects are the same.

In Switzerland, in the absence of any Federal system of old-age insurance (the principle of which has been accepted, though no steps have yet been taken to put it into force), there is an organisation for the relief of the aged which collects donations and gives assistance to old people. The city of Zurich has introduced a system of relief for the aged in the form of an annuity payable to all persons who have been resident

in the city for a certain number of years and, at the age of 65, are without means of subsistence.

The unemployed benefit by the particularly effective relief measures adopted by the authorities. As in other countries, the continuance of the economic depression has meant the exhaustion of unemployment insurance benefits in the case of a large number of workers who have been unemployed for too long a time. To prevent these workers and their families gradually becoming destitute, the authorities grant daily cash allowances adapted to local circumstances.

In several branches of national activity which are especially hard hit by the economic depression, such as the embroidery industry, the clock-making industry, the hotel industry and certain branches of agricultural production, the authorities have also given temporary financial relief to employers and entrepreneurs.

Turkey.

In Turkey, since the foundation of the Republic, the extensive public works, the varied building programmes and the policy of developing and expanding industrial enterprise have given rise to a labour shortage. At the sowing and harvesting seasons, when the majority of the population is working for its own account, public works and industrial enterprises sometimes suffer from a shortage of hands. On the other hand, the food problem, which is a result of the special climatic conditions in certain parts of Turkey, at times assumes such proportions that the authorities are compelled to take vigorous action to contend with it. Amongst the measures adopted and at present in operation may be mentioned the modernisation of agricultural methods, the extension of irrigation in districts affected by drought, the establishment of agricultural institutions, farm-schools and establishments for the improvement of seeds, the encouragement of new crops with due regard to conditions of soil and climate, the encouragement of stock-raising and the improvement of stock, and the reduction of taxation on live-stock.

The Government has also taken steps to facilitate the marketing of surplus production and in this connection particular interest attaches to the situation created by the operation of the Grain Protection Law, which makes provision for the purchase of grain by the State (at a reasonable price determined in advance) out of the proceeds of a tax on flour not required by the peasant for his own consumption, the object being to enable him to market his produce and to protect him from speculators. Thanks to the action taken by the Government in this direction, large stocks of grain have been accumulated in up-to-date grain elevators erected out of the proceeds of the flour tax.

Similarly, the Government programme of developing industry, and, in particular, the importance assigned to agriculture, has enabled the peasant to market his produce, and has led to a remarkable increase in

the output of a number of agricultural products—*e.g.*, sugar and textiles. The recently opened sugar and textile factories have revived beet-growing in the country and have greatly increased the cultivation of cotton. The results in the shape of improved nutrition of the population are obvious.

Among the efforts being made by the Government and by societies and committees under Government supervision with a view to improving the food conditions should be mentioned the large quantities of grain which have been distributed by the Government and the Agricultural Bank to necessitous cultivators, partly as a loan and partly as a free gift. In the year 1935, 31,070 tons of grain were distributed in different districts out of the stocks purchased at a fair price from peasants unable to sell their produce in the open market. The Red Crescent Society has further distributed 107 tons of foodstuffs.

The attempts made to provide the workers of the great industrial establishments with rational and healthy food have given substantial results. The draft Labour Law, which is at present being considered, contains special provisions for improving the canteens of factories in which healthy food will be supplied to the workmen.

Many of the factories working under State control supply food to the workmen and apprentices free of charge.

In the State educational establishments which receive boarders, the food satisfies all requirements.

Co-operative societies are being actively organised in order to improve food conditions for officials and workers in general.

United States of America.

The practical measures towards ensuring improved dietaries for various population groups in the United States have, in general, taken the form of education, supplemented in some cases by direct distribution of food either to the family or to individuals through school lunch or other feeding programmes. The largest direct distribution of food has been undertaken through the Federal Surplus Relief Corporation.

Relief clients have for the last several years received in many cases, in addition to cash stipends, surplus foods made available to State relief agencies by the Federal Surplus Relief Corporation, established by Federal law to take off the market certain foods declared to be surplus, and make them available for distribution in non-competitive channels.

The Federal Surplus Relief Corporation was created to help solve the paradox of hunger and destitution existing in a country with huge agricultural surpluses. Several years of agricultural surpluses in terms of effective demand had depressed prices to unprofitable levels and created a serious problem of agricultural destitution. At the same time, millions of people on relief stood in need of these products. Accordingly, the Federal Surplus Relief Corporation was created to serve as the instrument through which price-depressing surplus commodities might

be removed from the open market, processed and distributed to relief clients in such forms as foodstuffs and clothing.

Because the Federal Surplus Relief Corporation was set up to accomplish the dual purpose of agricultural and unemployment relief, it operated in close alliance with the Agricultural Adjustment Administration and the Federal Emergency Relief Administration.

The commodities which the Corporation distributes to State relief administrations are received from a number of separate sources.

1. The Agricultural Adjustment Administration has given to the Corporation large quantities of commodities purchased under its crop and price adjustment programme. The Agricultural Adjustment Administration has also donated to the Corporation large numbers of cattle, sheep and goats which it purchased as a part of the drought relief programme.

2. The Corporation, acting as agent for the States, has purchased surplus commodities for relief distribution. While these purchases are made by the Corporation through its division of procurement, they are paid for by funds granted to the States by the Federal Emergency Relief Administration, but transferred to the Corporation.

3. Local crop purchases constitute a third source of commodities distributed by the Corporation. These purchases are made directly by the State relief administrations situated in the crop-surplus areas. The purchases are closely supervised by the Corporation, however, and paid for by funds specifically granted to the States by the Federal Emergency Relief Administration for that purpose.

4. In addition to the commodities purchased, some surplus foodstuffs have been given to the Corporation by individual growers or groups of growers. This action was taken by the growers in preference to allowing the products to spoil. In these instances, the gathering of the surpluses is usually undertaken as a work-relief project.

In short, the Federal Surplus Relief Corporation itself purchases only a part of the goods which it distributes, the function of purchasing surpluses being divided among the Agricultural Adjustment Administration, the Federal Surplus Relief Corporation, and the local relief administrations.

The transportation and storage of all these commodities is primarily a problem of the Federal Surplus Relief Corporation alone. The processing of the commodities is sometimes done for the Corporation under contract and sometimes by the work divisions of the State Emergency Relief Administrations in collaboration with the Corporation. Distribution to State commodity distribution centres is a Federal Surplus Relief Corporation duty ; but, while the Corporation generally supervises and advises on the actual distribution to relief clients, the responsibility for successful distribution rests with State relief officials after the commodities have been delivered to them by the Corporation. Because no funds are appropriated directly to the Federal Surplus

Relief Corporation, all costs incurred by it for purchasing, processing or transporting commodities are paid by Federal Emergency Relief Administration allotments to the Corporation out of the funds granted to the States.

The following statement shows the quantities and costs of certain foodstuffs distributed by the Corporation. The table is in no sense a statement of all surplus-commodity expenditure to date, but it does include the full cost of certain surplus commodities turned over to the States by the Corporation for distribution.

Quantities and Estimated Value of Certain Commodities distributed to the States and Territories by the Federal Surplus Relief Corporation.¹
(October 1933 to July 31st, 1935.)

Commodity	Quantity	Total expenditure Dollars
Apples (dried).	lb. 885,350	121,000
Apples (fresh).	" 9,497,664	106,755
Beans	" 6,871,380	265,975
Butter	" 69,128,380	16,681,504
Beef (boned)	" 19,889,824	177,767
Beef (canned)	" 221,353,418	9,287,282
Beef (fresh)	" 35,106,167	150,170
Beef (tongues).	" 2,798,104	23,616
Cabbage	" 36,476,639	91,476
Cereal foods	" 20,296,440	1,179,227
Cheese	" 17,998,827	3,090,247
Cocoa ²	" 128,000	10,829
Flour	" 147,095,357	3,360,866
Fruit (citrous).	bags 194,935	59,301
Goat-meat (canned) . . .	lb. 777,600	—
Lard.	" 23,874,398	1,161,848
Meal (corn) ²	" 790,000	20,140
Milk (condensed) ²	" 790,000	58,712
Milk (evaporated)	" 37,595,200	1,961,632
Milk (dry skim)	" 8,688,100	525,275
Mutton (canned)	" 20,741,770	2,438,316
Pork products.	" 297,610,059	23,000,147
Potatoes (white).	" 239,427,800	1,504,761
Potatoes (sweet).	bushels 111,871	69,418
Rice	lb. 50,372,880	2,147,396
Salmon (canned) ²	" 768,000	66,612
Sausage ²	" 384,000	46,946

¹ Includes commodities purchased by the Federal Surplus Relief Corporation and the Agricultural Adjustment Administration, local surpluses purchased by State Relief Administration under Federal Surplus Relief Corporation purchase authority and reshipments of commodities turned over to the Federal Surplus Relief Corporation by the State Emergency Relief Administration.

² Shipments to Porto Rico.

Commodity		Quantity	Total expenditure Dollars
Sugar	lb.	9,000,000	372,180
Syrup	gallons	1,143,295	570,853
Veal (boned)	lb.	113,587	5,418
Veal (canned)	„	20,804,247	2,024,476
Veal (fresh)	„	85,761,375	160,929
Veal (tongues)	„	521,573	947

Out of 5,200,000 households (cases) receiving emergency relief under the general relief programme in February 1935, it is estimated that there were about 1,900,000, or 36%, located in rural areas and 188,000, or 4%, in small towns of 2,500 to 5,000 population. The ratio of rural relief cases to all relief cases appears to have changed very little since October 1933.

The relief situation as shown by a sample study of nine major agricultural areas in February 1935 presents striking differences among the areas and reflects clearly the severity of conditions existing either temporarily or permanently in these areas. Effects of the drought are particularly noticeable in certain sections, and a permanent condition such as exists in the Lake States cut-over areas has forced on the relief rolls almost 40% of the rural families in that area. This study also brings out the unfavourable position of non-farm families as compared with farm families. The unfavourable status of the tenant and share cropper groups as compared to the owner-operator group is also disclosed.

Agricultural labourers and farm families have been reached through the Agricultural Extension Service. In many States, special educational programmes have been prepared to reach the agricultural labourers and tenant farmers, both directly and indirectly. Home production programmes suited to the different areas have been worked out and an effort made to help the agricultural worker directly through education in wise food choice. In some areas, the landlords have made land available for the production of food. The extension programme has done much in the way of improving the diet of independent farm families with the same type of education and the stimulation of home production of food for family use. The decrease in the incidence of pellagra in the South is in large part attributable to the educational programmes undertaken by the State extension service.

The unemployed and persons in receipt of relief have been reached, as indicated above, by distribution of cash and relief in kind, and by educational programmes. In every State, there have been educational programmes in nutrition set up under the Emergency Relief Administration, advising the clients in food selection as well as educating them in the use of the commodities distributed.

There has been little work done with the industrial workers as such, except as they have been reached by welfare agencies, private industries or educational groups of their labour organisations. In general, there has been less direct work with them than with other groups.

Uruguay.

For unemployed persons and persons in receipt of relief, the Government of Uruguay has instituted public kitchens in various parts of the capital, where food can be obtained very cheaply by indigent persons.

In certain industrial establishments, the employers have arranged for the staff to receive economical and rational meals, and the National Commission for Rational Nutrition, in the course of its visits, appreciated the sound composition of those meals from the standpoint of the quantity and quality of the various foodstuffs.

In the private field should be mentioned the efforts of social assistance and welfare institutions, which maintain cheap canteens.

Venezuela.

In the child welfare centres in Venezuela, established under the Ministry of Health, Agriculture and Education, sterilised milk is given to children. This milk is the subject of a daily bacteriological test.

The special centres of the Red Cross organisation distribute meals to poor mothers.

Yugoslavia.

In the year 1931-32, when the poorer regions of Yugoslavia suffered from drought, the State sent to them, through the Privileged Exportation Company, 2,076 wagons, each of 10 tons, of wheat and 1,138 wagons of maize.

At the end of October 1935, further action was taken to assist the "passive" areas. The Government voted a credit of 20 million dinars, and, in January 1936, a further sum of 8 million dinars, to provide food for the impoverished inhabitants of those areas. With the help of these funds, the Privileged Export Company has so far despatched 1,156 trucks of maize to the areas in question.

This assistance is given free of charge—as in the year 1931-32—only to persons disabled for work. All other persons are required to pay for the assistance by taking part in public works arranged by the banovine concerned.

In addition to supplying direct aid in the form of food, the Government indirectly helps to supply the "passive" areas by lowering transport rates. On October 1st, 1935, for instance, the railway rate for the carriage of maize over distances exceeding 500 km.—which chiefly affected the areas in question—was reduced by from 15% to 31%. In addition to

these privileges, the Ministry of Social Welfare issues permits for the free carriage of wheat and fodder.

FEEDING THE UNEMPLOYED.

There are 120,000 unemployed in Yugoslavia. Legislation makes it incumbent on the labour exchanges to assist the unemployed. For this purpose, the departmental offices of social insurance levy a subscription of 6 per mille on employed workmen's wages, half of which is paid by the workmen and the other half by the employers. These subscriptions produce about 22 million dinars per annum. The labour exchanges have had to make certain restrictions in the matter of granting relief, so that only a given number of workmen can obtain benefit, and that for a limited time. The feeding of the unemployed therefore falls mainly on municipal and banovine authorities and on private organisations. The task of feeding Belgrade unemployed falls on the Central Committee for Unemployed Relief, consisting of representatives of the central and regional authorities, workmen's associations and private societies.

From January 7th to April 10th, 1934, this committee issued to the unemployed 206,831 hot meals. This food was supplied to 5,582 persons. In addition, the "Daily Bread" Society issued, on presentation of the committee's identity card, bread to 3,304 unemployed workmen and office employees. Between December 16th, 1934, and April 14th, 1935, the committee distributed 284,187 hot meals. The food was supplied to 10,489 persons.

CHAPTER IV.

ARMY AND NAVY DIETARIES.

Apart from the case of unemployed and indigent persons and persons in receipt of relief, the feeding of adults is not normally regarded as a matter for direct Government action as regards quantity or quality. There are, however, notable exceptions to this rule, inasmuch as there are collective bodies in all countries, such as armies, which the State has to feed, as well as public institutions with boarders.

Such special cases as the dietary of prisons, hospitals and the like do not fall within the scope of this study.

The question of the feeding of the armed forces has always, by reason of its importance and of the technical difficulties involved, been the object of careful supervision and of special action.

Union of South Africa.

The scale of rations in the Union Defence Forces for all ranks (European members), excluding Union cadets, is as follows (full ration for soldier, one-half ration for wife and one-quarter ration for each male child under 16 and each female child under 18 years of age, with a maximum of six children) :

Ration (daily scale)	Equivalent
Bread 1 lb.	
Mealie meal 2 oz.	Wamo meal 2 oz.
	or Oatmeal 1 "
Fresh meat. 1 lb.	Sausage or liver at equivalent money value.
Tea. $\frac{1}{2}$ oz.	Cocoa $\frac{3}{4}$ oz.
Coffee. $\frac{1}{2}$ "	Cocoa $\frac{3}{4}$ "
Sugar 5 "	
Salt. $\frac{3}{8}$ "	
Pepper $\frac{1}{64}$ "	
Potatoes 12 "	Sweet-potatoes 12 oz.
	or Rice in lieu of 6 oz. $1\frac{3}{4}$ "
	or Samp in lieu of 6 oz. 4 "
Vegetables. 10 "	Dry beans in lieu of 5 oz. 2 "
	or Lentils in lieu of 5 oz. 1 "
Dried fruit. 2 "	Fresh fruit twice weekly 4 "
Butter 2 "	
Cheese 1 "	
Jam 2 "	$\frac{1}{4}$ lb. packet jelly powder once weekly.
Milk, fresh $\frac{1}{2}$ pint	Milk, condensed (nominal lb.) $\frac{1}{4}$ lb.
Flour $\frac{1}{2}$ oz.	Pearl barley $\frac{1}{2}$ oz.
Bacon. 2 "	Fish fresh once weekly 4 "
	or
Boer beskuit or rusk (weekly). $\frac{1}{2}$ lb.	Eggs, excepting days on which fish is issued. $1\frac{1}{2}$ eggs.

Austria.

In Austria, the daily rations prescribed for soldiers in permanent garrison quarters have, on an average, a nutritive value of 3,300 calories, made up as follows :

Foodstuffs	Quantity in grammes, except liquids	Meal	Average nutritive value Calories Rubner's system	Nem Firquet's system	
Coffee, roasted	4	} Breakfast	221	331	
Barley or malt coffee	6				
Fig coffee	5				
Sugar	20				
Milk (centilitres)	20				
Bread	600	Per day	1,340	2,010	
Beef	160	} Midday meal and evening meal	287	431	
Vegetables {	Legumes		40	107	161
	Potatoes		250	208	312
	Kitchen flour.		70	234	351
	Rice		60	198	297
	Pickled or fresh.		40	8	12
Fat	50		} Midday meal and evening meal	442	663
Cheese	50			166	249
Jam	10			22	33
Sugar	15			60	90
Cooking requisites {	Salt.	20		—	—
	Vinegar (centilit.)	0.5	—	—	
	Condiments	0.5	—	—	
	Soup greens, powdered	1	2	3	
	Onions, fresh.	15	5	7	
Total			<u>3,300</u>	<u>4,950</u>	

The daily rations of soldiers engaged on field exercises and assistance work away from their garrison quarters are increased by 582 calories in the form of a snack which the soldiers take with them in the field.

During manœuvres and strenuous exercises in high mountain districts, the daily rations are further increased by 100 grammes of beef (nutritive value, 180 calories), to allow of a more copious evening meal.

The cookhouses are not strictly tied to the "standard rations" as given above. The bill of fare, which is drawn up in consultation with a cookhouse committee on which the men are represented, should, on the contrary, and as far as the available funds allow, be varied, wholesome, palatable and in accordance with the men's wishes, provided always that the food served has the same nutritive value as the standard rations. Only the prescribed rations of meat, milk and cheese may not be replaced by other foods, in the interests of the marketing of home

agricultural produce. Soldiers who for service reasons are unable to take their meals in the ordinary mess receive a cash allowance representing $1\frac{1}{2}$ times the estimated cost of the rations, since individual meals (in inns, etc.) prove more expensive.

Apart from the above-mentioned standard rations, the following may also be issued to troops for various special reasons :

(a) An additional bread ration of 200 grammes daily (nutritive value, 447 calories), which is served out to the members of the military assistance corps (young men), as new recruits are frequently under-nourished and the early stages of training involve great physical strain.

(b) An additional food allowance equivalent to the value, as fixed from time to time, of 300 calories issued to those engaged in field work in the pioneer service, the support companies, etc.

(c) An additional health allowance representing the actual cost of 1 gramme of ordinary household tea, 30 grammes of sugar and 2 centilitres of rum per day when the Army Medical Corps officially recognises the outbreak of an epidemic.

At the Theresa Military Academy, the rations are governed by the same rules as in the case of the ordinary troops. As during the academic year, however, the cadets are constantly under a special physical and mental strain, they are allowed an extra food grant equal to twice the above additional food allowance (cost of 600 calories).

Belgium.

In Belgium, the following are the food rations of the private soldier :

(a) *Ordinary ration :*

Fresh or frozen meat	300 grammes
Bread	600 grammes
Coffee	10 grammes
Chicory	5 grammes
Milk	2 centilitres
Margarine	25 grammes
Rice or peas or beans or alimentary pastes	25 grammes
Salt	20 grammes
Pepper	$\frac{1}{4}$ gramme
Potatoes	1,200 grammes

Fresh vegetables, a varying quantity, approximate cost 20 centimes per day.

Fats and condiments used in the preparation of the above, approximate cost 20 centimes per day.

(b) *Field ration :*

Fresh or frozen meat	450 grammes	
Bread	750 grammes	
Coffee	25 grammes	
Lard or margarine	40 grammes	
Sugar	30 grammes	
Chicory	} Same as ordinary ration	
Rice or peas or beans or alimentary pastes		
Salt		
Pepper.		
Potatoes		

United Kingdom.

THE NAVY'S FOOD.

The naval standard ration, and certain extra issues allowable in special circumstances, are as follows :

(i) *Standard ration :*

	Oz, daily
Bread	10
Fresh meat	8
Vegetables	16
Sugar	2
Tea	$\frac{1}{2}$
or Coffee	2
Chocolate	$\frac{1}{2}$
Condensed milk	$\frac{3}{4}$
or Fresh Milk	5 (<i>i.e.</i> $\frac{1}{4}$ pint).
Jam, pickles or marmalade	1
Preserved meat or salmon	4 (On one day in harbour or two days at sea, weekly.)

Condiments as required.

In addition :

Spirit ration : Rum, one-eighth pint daily, or "grog money" in lieu.

Plus messing allowance. This allowance stands at present at 7.7*d.* a day on the home station.

(ii) *Extra Issues :*

(1) On duty in engine-room :

	Oz. daily
(a) Oatmeal	2
Sugar	1/2
or	
(b) Lime Juice	1
Sugar	1

(2) Employment of exceptional character involving heavy extra work such as coaling, etc., or men exposed by their duties to unusually severe weather :

	Oz. daily	
Bread or biscuit	8	
Preserved meat	6	
(a) Soluble chocolate	1/2	}
or		
(b) Tea	1/8	
or		
(c) Coffee	1/2	
or		
(d) One of the issues in paragraph (i) above.		

Plus 1/4 oz. sugar and 1/2 oz. condensed milk

The ration is supplemented by a money allowance for the purchase of additional foodstuffs according to the requirements of individual messes. In ships where messing is conducted on the general messing system, a full dietary is provided by the Accountant Officer. Four meals are provided—viz., breakfast, dinner, tea and supper—and the quantities in the standard ration may be varied as considered desirable, expenditure being regulated by an appropriate daily money allowance per man victualled.

Regular reports from the Fleet on the messing of the personnel ensure that a standard is maintained that is fully adequate in all respects. The approximate total calorie value of the sailor's dietary is 4,000 calories.

DIETARY OF THE ARMY.

The dietary standard of the soldier is based on a ration of 3,800 calories gross, provided by approximately 130 grammes each of proteins and fat and 500 grammes of carbohydrates; about 60% of the proteins is derived from animal sources. Certain articles of the diet are issued in kind and the balance is purchased out of a cash allowance to provide variety and a sufficiency of accessory food factors.

To assist units in obtaining full value from the rations, a specimen diet-sheet is prepared and issued quarterly by an expert catering officer, who works in close liaison with the Hygiene Branch at the War Office.

With the same object, messing officers and cooks of units are trained in the subject at the Army School of Cookery.

For troops serving at overseas stations (except India, where they are not administered by the War Office), a standard of feeding equal to that obtaining in this country is aimed at.

Czechoslovakia.

The experience of the Czechoslovak Military Administration has been as follows :

The administration fixed dietary standards on the basis of practical requirements and scientific research. Apart from meat, the soldier's ration consists entirely of agricultural products, so that the army consumption of such commodities is a large one. The Czechoslovak soldier's ration is sufficient for any man engaged in hard work.

The military units fix their bill of fare, as prescribed in the regulations, according to the customs of the district and the habits of the men, and also the local possibilities of purchase, but always with strict regard to the above-mentioned regulations. The diet must not be monotonous and must in any case be of the prescribed caloric value.

The Army Administration sees that the dietary contains a sufficient quantity of vitamins, including, therefore, foodstuffs in which they are present (milk, fresh vegetables, fat, etc.).

The energy-forming nutritive value of an army ration is quite adequate, as is proved by the sound health of the army.

Estonia.

In fixing the dietary, the authorities in Estonia have borne in mind the need for variety. The composition of the daily ration must be such as to compensate physically for the loss of energy in the organism, and at the same time to build up that organism and promote its development. In the preparation of food, the guiding principle has been to safeguard the nutritional value as far as possible, particularly in the matter of vitamins. The dietary of each army unit is composed weekly, with the assistance of an army doctor.

There are two forms of army dietary : the ordinary and the increased standard. The ordinary standard applies in the various units and military institutions and the increased standard in military schools and in the Air Force. The standard in hospitals is 40% and in sanatoria 50% higher than the ordinary standard. The daily dietary, according to the ordinary standard, contains 91 to 108 grammes of albumins, 61 to 80 grammes of fat, and 550 to 600 grammes of carbohydrates—*i.e.*, 3,300 to 3,500 calories net.

Finland.

In Finland, the ordinary ration which forms the basis of the army's diet comprises the following quantities of various foodstuffs :

	Grammes
Rye bread, dry	450
Beef, fresh (dead weight)	120
Pork, fresh (dead weight)	50
Baltic herring, pickled	50
Butter	40
Peas	50
Oatmeal	100
Potatoes	800
Lump sugar	40
Full-cream milk	0.5 litre

Calculating the value of those foodstuffs at current market prices, and adding a certain sum in cash for groceries and other necessities (at present 7% of the total cost price of the standard ration), we arrive at the amount of the daily subsistence allowance within the limits of which each unit can arrange its dietary as it thinks fit. This system has the advantage of making it possible to keep very close to the fluctuations in local prices, and also leaves each unit full latitude to provide the precise kinds of food customary in the area from which the men are recruited.

Although units have considerable latitude in framing their dietary, it has been thought well to lay down certain general practical rules dealing with dietary physiology :

- (1) The diet must be based on a fortnightly diet-sheet drawn up in advance, showing the bill of fare for each day ;
- (2) The nutritive value of the daily ration must average 3,800 calories net, and must in no case be less than 3,500 ;
- (3) In its chemical composition, the daily ration must observe the proper physiological proportions ;
- (4) The dietary must conform to seasonal changes, so that more foodstuffs containing calcium hydrates are eaten in summer, and in winter more fats, full-cream milk, raw foods and foodstuffs rich in vitamins ;
- (5) The diet must be so arranged that the men receive adequate, well-prepared, palatable and sufficiently varied meals.

The amount of the daily subsistence allowance may be influenced by special conditions in certain units and establishments. For example, the allowance is increased by 10% in warships at sea, and by 15% in military hospitals.

France.

In France, the various regimental authorities have a considerable latitude in their purchases and commonly select " protective " foodstuffs. Bills of fare of the meals are submitted for approval to army doctors (see Chapter VII, below, pages 231 *et seq.*).

Iraq.

The standard diet for the Iraq army, both for officers and for men, is as follows :

	Soldiers Grammes	Officers' school (18-25 years) Grammes
Bread (wheat)	600	600
Rice	200	300
Meat (generally mutton)	150	300
Milk	—	50
Butter fat (Ghee)	40	105
Fresh vegetables	330	500
Dry vegetables	150	—
Lentils	80	—
Fruits	—	150 to 500
Sugar	—	60
Jams	—	40
Salt	23	28
Tea	—	3
Tomato juice	15	15
Lemon juice	1	2
Pepper and curry	—	1

Italy.

ARMY.

Various improvements have been made during the past few years. The soldier's ration no longer presents the terrible monotony of former years, and the food has also gained in nutritive value.

The improvements made consist in : (1) the replacement twice a week, at the first meal, of meat by farinaceous dishes or rice with vegetables plus a ration of table cheese, thus utilising a product with which the country is well provided ; (2) the consumption once a week, during certain periods of the year, of a ration of " dentale " (fish

preserved in oil) ; (3) the supply of milk with the morning coffee ; (4) the introduction of a " free day "—*i.e.*, once a week the various corps and sections, instead of receiving the normal meat ration for their men from the stores, are given a sum with which they may purchase foodstuffs on the local market (poultry, fish, beef, pork, etc.), endeavouring as far as possible to suit the tastes of the men ; (5) increase in the quantity of green vegetables in the composition of the military ration, and hence increase in the vitamin content.

The innovations introduced have raised the total protein content, more particularly of proteins possessing the greatest value (cheese, milk), which is very important when it is considered that the army consists largely of young men who are still growing. The same applies as regards the proportion of fats, which has almost reached the quantity of 75 grammes fixed during the war by the Inter-Allied Scientific Commission.

Thus, the present ration for garrison troops supplies the soldier with about 3,200 calories per day. When the troops have harder work to perform (camps, manœuvres, etc.), or find themselves in peculiar climatic conditions, they are given a special supplementary ration of certain foodstuffs which form part of the normal ration. Thus, a soldier taking part in field manœuvres obtains about 3,700 calories from his ration, while a soldier stationed in the mountains receives about 4,100.

In the military schools and regimental schools, where there is a mess, the dietary is more varied. Usually, each school command draws up a list for the two meals for each day of the week, and this list is approved by the competent health authorities in order to preclude physiological or sanitary disadvantages.

The food ration in East Africa is designed to meet all contingent physiological requirements ; it appears to be sufficiently varied, if one takes into account the special conditions of supply. The vitamin content is ensured by the systematic distribution of lemons, oranges and other fruit.

The individual reserve ration (biscuit, 400 grammes ; tinned meat, 200 grammes) supplies a number of calories below the normal ration. This is also the case in many other armies. It may be noted, however, that this ration is consumed only in exceptional circumstances and for a fairly limited time (one or two days). A scheme is under consideration for including in the reserve ration a tin of prepared soup, which would raise the number of calories by about 500.

The dietary of the troops is subject to permanent supervision. The condition and state of preservation of the various foodstuffs are inspected at the time of purchase and when actually employed in the units. When large quantities of foodstuffs are purchased, steps are taken to make sure of their content in certain fundamental chemical substances. In the various units, the Food Inspection Commission supervises the working of the Commissariat, and the Inspector of Sanitary Services exercises supervision in all matters relating to

hygiene. In this connection may be mentioned the strict supervision that is exercised over the health of persons attached to the different branches of the Commissariat, with special reference to infectious diseases whose seat is in the intestines (detection of possible carriers).

NAVY.

Similar criteria have determined the composition of the navy ration. Since the application of sanctions, it may be noted, meat has been stopped on Tuesdays, until further notice. With the sum representing the cost of the ration of 250 grammes of meat for that day, the commands must purchase on the market fresh fish or eggs or tinned tunny or "dentale". The composition of the ration admits of changes, as the command, instead of purchasing part of the foodstuffs specified in the list, can always purchase other foodstuffs with the sum provided.

The distribution of the supplies specified in the list is effected daily by the Royal Marine Stores for men on shore, and by the Naval Commissariat for vessels of the navy. The Naval Commissariat depots obtain fresh supplies periodically from the naval bases' stores.

AIR FORCE.

The composition of the rations, studied and introduced in the air force with certain additions and modifications, shows that it constitutes for individuals serving under very varied circumstances and conditions a perfect dietary, which corresponds both qualitatively and quantitatively to the requirements of the organism.

The power of discretion whereby commands may replace certain commodities by others more suited to the season and to local conditions has always permitted of providing a wholesome, ample and palatable diet.

All foodstuffs for the mess, which must satisfy certain technical requirements laid down in the special regulations, are subject to strict inspection at the time of purchase.

In order to provide for members of the forces, and to some extent also for the civilian personnel, wholesome, adequate and properly prepared food with that minimum of comfort which the austere and fatiguing conditions of camp life—often remote from all ordinary human habitations—allow, special canteens have been established at all the service air ports and at the Royal Aeronautical Academy.

Efforts in two other directions should also be mentioned—namely, the co-operatives and the farms established in practically all military airports. The co-operatives make it possible for the men to procure all kinds of provisions cheaply and of good quality; the farms are engaged in vegetable and fruit growing and the raising of poultry for the benefit of the personnel of the air ports, who are thus able to enjoy a more varied diet.

Latvia.

NUTRITION STANDARDS IN THE LATVIAN ARMY.

The following table shows the quantity of foodstuffs consumed by a soldier in the Latvian army in a month :

Product	Standard of consumption Grammes	Content and calorific value				
		Albumens	Fats	Carbohy- drates	Other sub- stances	Calorific value in kilo-calories
		Grammes	Grammes	Grammes	Grammes	
Rye bread	18,600	1,186.68	78.12	10,131.42	630.54	47,128.68
Wheat bread	6,200	539.40	57.66	3,252.52	159.34	16,083.42
Fresh beef	4,500	554.85	216.45	11.70	523.80	4,335.30
Salt pork	1,485	318.53	399.32	—	188.—	5,019.60
Salted small herrings	120	22.72	8.53	—	16.97	172.48
Fresh fish	550	66.22	1.27	—	29.91	283.25
Tinned fish	120	21.65	17.94	1.38	21.18	261.24
Fresh milk (as an ingredient)	4,120	123.60	123.60	193.64	37.08	2,448.10
Curds	240	41.16	2.76	9.48	3.—	233.30
Eggs (each)	0.25	1.57	1.50	0.08	0.13	20.75
Bacon	2,170	210.92	1,643.78	—	116.75	16,151.74
Barley meal or pearl barley	1,710	197.51	37.79	1,193.58	41.73	6,054.94
Peas	1,260	293.58	23.44	662.76	103.83	4,138.97
Macaroni	560	63.06	7.39	418.32	4.32	2,042.43
Wheat flour	570	62.70	7.35	416.10	5.70	2,031.48
Potatoes	15,350	307.—	23.03	3,202.01	317.75	14,602.46
Carrots	2,060	24.31	5.97	186.64	55.62	920.61
Turnips	500	6.95	0.90	36.85	10.90	187.95
Beetroot	300	3.93	0.30	20.40	5.61	102.33
Fresh cabbage	930	14.14	1.40	38.78	19.07	229.99
Sauerkraut	3,040	41.04	10.34	85.42	124.34	608.61
Dried apples	100	1.42	0.75	58.88	7.67	254.21
Prunes	30	0.58	0.15	15.95	5.27	69.13
Starch	30	0.26	0.02	24.20	0.19	100.46
Cranberries	160	0.10	—	21.70	3.30	93.47
Salt	620	—	—	—	—	—
Onions	620	8.06	0.87	58.53	7.94	281.05
Pepper	6.2	—	—	—	—	—
Coffee	310	13.42	4.34	10.42	257.67	138.11
Milk (for coffee)	1,860	55.80	55.80	87.42	16.74	1,105.21
Sugar	1,240	—	—	1,233.80	—	5,058.58
Total for one month (31 days)		4,182.16	2,730.77	21,371.98	2,713.65	130,157.85
Average per day		134.91	88.09	689.42	87.54	4,198.64

Poland.

The army of Poland has its own nutrition standards. In peace-time, there are four basic food rations and four supplementary rations, established according to the relevant provisions. The minimum standards are taken as a basis and may be augmented in the various units as the

result of economical management or special grants. The composition and caloric value of the various basic rations and supplementary rations is as follows :

Food	Unit of measurement	1	2	3	4	5	6	7	8	
		Basic ration				Extra ration				
		Normal ration " N "	School ration " S "	Disciplinary ration " K "	Total ration for the sick " L "	Extra bread	Anti-epidemic allowance	Allowance for heavy work	Milk allowance	
1. Army bread	Grammes	800	300	700	300	200	—	—	—	
2. Wheaten bread	"	—	300	—	—	—	—	—	—	
3. Rye bread	"	—	—	—	150	—	—	—	—	
4. Wheaten rolls	"	—	—	—	100	—	—	—	—	
5. Coffee extract	"	50	25	25	—	—	—	—	—	
6. Roasted coffee beans	"	—	—	—	10	—	—	—	—	
7. Tea	"	—	1	—	1	—	1	1	—	
8. Milk	Centilitres	—	40	—	40	—	—	—	100	
9. Sugar	Grammes	—	70	—	70	—	10	10	—	
10. Beef	"	250	400	150	200	—	—	50	—	
11. Veal	"	—	—	—	100	—	—	—	—	
12. Vegetables in a dry state	"	150	140	175	100	—	—	—	—	
13. Flour	"	—	—	—	—	—	—	—	—	
14. Fresh vegetables	"	200	200	100	250	—	—	—	—	
15. Fresh fruit	"	—	—	—	50	—	—	—	—	
16. Potatoes	"	700	500	700	500	—	—	—	—	
17. Bacon	"	50	50	30	30	—	—	25	—	
18. Butter	"	—	20	—	40	—	—	—	—	
19. Eggs	Each	—	—	—	$\frac{1}{2}$	—	—	—	—	
20. Flour for cooking	Grammes	10	10	10	10	—	—	—	—	
21. Kitchen salt	"	22	22	22	22	—	—	—	—	
22. Fresh onions	"	15	15	15	15	—	—	—	—	
23. Dried vegetables	"	1	1	1	1	—	—	—	—	
24. Spice	"	0.5	0.5	0.5	0.5	—	—	—	—	
25. Vinegar	Centilitres	0.5	0.5	0.5	0.5	—	—	—	—	
Caloric value		3,476	4,302	2,998	3,407	414	40	270	600	

Men serving in the navy receive on land the food rations and, if necessary, the extra rations allowed to the land army. Sailors on board ship always receive the extra ration for men performing heavy work and the anti-epidemic allowance, in addition to ordinary rations.

Sweden.

In the Swedish army, the direct responsibility for the victualling of a military unit lies with the commanding officer, assisted by the commissary (quartermaster) of the regiment. They attend to the necessary purchases of provisions and must see to it "that the men get such food as is liked, and is good and plentiful, and all the necessary variety".

In each military unit, a non-commissioned officer is appointed superintendent of the kitchen, as such serving directly under the quartermaster. It devolves on the superintendent of the kitchen to receive and be responsible for all articles of food, to superintend the men's kitchen and to be responsible for the preparation and distribution of the food.

The price of portions per man and day is calculated in accordance with an index established by the King, the s.c. normal-portion-estimate. As a minimum for the supply of provisions per day, there are fixed 3,675 calories; as the upper limit, 3,900 calories. Under circumstances of special exertion, the dietary is adapted accordingly.

Example of a Weekly Dietary Estimate.

Bread :	August-October	November-April	May-July
Spiced bread . . .	420 grammes	560 grammes	520 grammes
Soft coarse	360 "	420 "	360 "
Dry	490 "	490 "	490 "
Biscuits	50 "	35 "	35 "
Soft wheat	570 "	490 "	595 "
Bread in reserve .	—	20 "	20 "
Fish :			
Fresh	225 "	225 "	225 "
Herring, pickled .	125 "	125 "	150 "
Dry fruit	145 "	105 "	105 "
Vegetables	822 "	340 "	109 "
Groats	300 "	235 "	270 "
Dairy products :			
Milk (0.8% fat) . .	1.53 litre	0.6 litre	1.5 litre
Unskimmed milk .	2.5 "	3.15 "	1.6 "
Skimmed milk . .	0.9 "	0.9 "	2.0 "
Cream	0.12 "	0.1 "	0.11 "
Butter	440 grammes	465 grammes	465 grammes
Cheese	310 "	380 "	150 "
Flour	245 "	210 "	292 "
Roots	4,265 "	2,900 "	2,280 "
Of which potatoes .	3,100 "	2,250 "	2,250 "
Juice and jam . . .	820 "	735 "	935 "
Sugar treacle . . .	378 "	327 "	278 "

Meat :	August-October	November-April	May-July
Preserved meat . .	200 grammes	200 grammes	200 grammes
Dripping	70 "	60 "	40 "
Blood	—	100 "	100 "
Pork, uncured . .	425 "	120 "	—
Pork, cured	—	370 "	250 "
Bacon	—	175 "	—
Mutton	250 "	—	—
Brawn (from veal) .	125 "	—	—
Pork sausage . . .	150 "	100 "	175 "
Sausage, to be fried	—	125 "	175 "
Suet	—	25 "	25 "
German sausage .	—	30 "	100 "
Fresh beef	250 "	275 "	150 "
Sausage (Swedish) .	—	—	250 "
Various articles of food :			
Chocolate (for the army)	—	20 "	20 "
Coffee	70 "	60 "	70 "
Tea	1 "	1 "	—
Tomatoes	200 "	—	—
Almonds	6 "	10 "	—
Eggs (each)	1.4	2.4	4.3
Macaroni	—	—	70 "
Peas	—	180 "	90 "
Calories, per day. . .	3,721	3,800	3,680
Albumen, grammes per day	112	124	115

The regimental doctor assists the commanding officer in examining questions concerning portion estimates and the like. He examines each dietary estimate and attests the examination. The dietary estimates are also controlled from a medical point of view by the doctor of the army division. The Health Section of the Army Board has a final right to examine the estimates.

Very similar regulations are in force in the navy.

Switzerland.

The dietary of the army in Switzerland is designed to correspond as closely as possible to the dietary of civil life, the short periods of service precluding any systematic adaptation to a different system. Observations have been made mainly in connection with the training courses for recruits (nine to fifteen weeks, according to the arm in question).

The Swiss military ration, consisting of four main elements, is as follows :

(1) Bread ration, 500 grammes. The ration is not distributed individually. The men help themselves as they please. It is found that the average consumption does not exceed 500 grammes.

(2) Meat ration, 250 grammes. The meat (cow or ox beef) is replaced once a week by other meat of equivalent monetary value and is once a week omitted from the dietary. The 250 grammes ration is found perfectly adequate.

(3) Cheese ration, 70 grammes. Available as required. The ration is found ample.

(4) Vegetable portion, value 42 to 46 centimes. The portion includes, in addition to fresh or dried vegetables, milk, coffee, chocolate and tea. Experience shows that a daily expenditure within the limits given is ample for all requirements.

The above observations were made on recruits (ordinarily of 20 to 21 years of age) from all parts of Switzerland.

Turkey.

In Turkey, army rations are drawn up in accordance with laws and decrees in force. The rations of a soldier in peace-time are the following :

	Grammes
Bread	900
Meat	250
Rice or threshed wheat (boulgour) .	150
Butter	20
Salt	20

United States of America.

The army ration is prescribed by the President under the provisions of Section 40, Act of February 2nd, 1901. The Filipino ration is prescribed by the Secretary of War under the provisions of Section 36, Act of February 2nd, 1901, as amended by the Act of May 10th, 1926.

It is the duty of the officers of the (Subsistence Department) Quartermaster Corps, under the direction of the Secretary of War, to issue to the army such supplies as enter into the composition of the ration.

The following kinds of rations are provided :

- (1) The garrison ration ;
- (2) The Filipino ration ;
- (3) The travel ration ;
- (4) The field ration ;
- (5) The reserve ration.

Garrison Ration. — The garrison ration is that prescribed in time of peace for all persons entitled to a ration, except under specific conditions for which other rations are prescribed, and consists of the following :

Meat : ^{1 2}	Oz.	Beverages :	Oz.
Bacon.....	2	Coffee, roasted or roasted and ground	2
Beef, fresh ³	10	Cocoa	0.3
Chicken, fresh	2	Tea.....	0.05
Pork, fresh	4		
Eggs, fresh (each)	1	Milk : ⁴	
Dry vegetables and cereals :		Milk, evaporated	1
Beans	0.5	Milk, fresh.....	8
Rice	0.6	Lard :	
Rolled oats	1.5	Lard.....	0.64
Fresh vegetables :		Lard substitute	0.64
Beans, string, canned	3	Butter	2
Corn, canned.....	2	Flour, wheat ⁵	12
Onions	2	Baking powder	0.09
Peas, canned.....	2	Macaroni	0.25
Potatoes	10	Cheese	0.25
Tomatoes, canned	2	Sugar	5
Fruit :		Cinnamon	0.014
Apples, canned.....	1.5	Flavoring extract.....	0.02
Jam or preserves	0.5	Pepper, black	0.04
Peaches, canned.....	1.2	Pickles, cucumber	0.16
Pineapple, canned	1.2	Salt.....	0.5
Prunes	0.3	Sirup	0.5
		Vinegar	0.16

The dietary of the United States navy is fixed by law :

“ *Section 1.* — The navy ration issued to each person entitled thereto shall consist of the following daily allowance of provisions : Eight ounces of biscuit or twelve ounces of soft bread or twelve ounces of flour ; twelve ounces of preserved meat or fourteen ounces of salt or

¹ In Alaska, the beef component will be increased by 10%, the bacon component by 33¹/₃% and the vegetable component by 20%.

² On Thanksgiving Day and on Christmas Day, the meat component will be as follows: Turkey, drawn, 25 ounces; turkey, undrawn, 28 ounces.

³ Alternate for and hind quarters.

⁴ In the Philippine Islands and at remote stations where it is impracticable to procure fresh milk, the milk allowance will be 6 ounces of evaporated milk.

⁵ When it is impracticable to bake soft bread, or if for any reason it is more economical to purchase than to bake it, soft bread will be a component in lieu of an equal quantity of flour.

smoked meat or twenty ounces of fresh meat or fresh fish or poultry ; twelve ounces of dried vegetables or eighteen ounces of canned vegetables or forty-four ounces of fresh vegetables ; four ounces of dried fruit or ten ounces of canned fruit or six ounces of preserved fruit or sixteen ounces of fresh fruit ; two ounces of cocoa or two ounces of coffee or one-half ounce of tea ; four ounces of evaporated milk or one ounce of powdered milk or one-half pint of fresh milk, together with one ounce and six-tenths ounces of butter, one and six-tenths ounces of cereals or rice or starch foods, one-half ounce of cheese, one and two-tenths ounces of eggs, one and six-tenths ounces of lard or lard substitute, two-fifths of a gill of oils or sauces or vinegar, five ounces of sugar and such quantities of baking powder and soda, flavouring extracts, mustard, pepper, pickles, salt, syrup, spices and yeast as required.

“ *Section 2.* — Any article comprised in the navy ration may be issued in excess of the authorised quantity, provided that there be an under-issue of the same value in some other article or articles.

“ *Section 3.* — The Secretary of the Navy is authorised to increase the above-stated allowances on those vessels having an allowed complement of less than one hundred and fifty men and subsisting on a ration allowance, when, in his opinion, such vessels are operating under conditions which warrant such increases.

“ *Section 4.* — The Secretary of the Navy is authorised to fix the limit of the cost of rations on destroyers, submarines, mine-sweepers, tugs, aircraft and other vessels subsisted under the direction of commanding officers.”

The Bureau of Supplies and Accounts is responsible for the purchase and preparation of food, and the Bureau of Medicine and Surgery, through its medical officers, is charged with the responsibility of inspecting the food with respect to quality, manner of preparation and serving.

Yugoslavia.

In Yugoslavia, the problem of the feeding of the recruits for the army and navy has been settled by the establishment of a table of the different foodstuffs which go to make up the soldier's daily ration.

The table has been compiled, having regard to particular national tastes and customs, with a view to providing sufficient variety while at the same time affording full nutritive value corresponding to the physical effort demanded by military service.

The table provides for the daily supply of the following foodstuffs, subject to minor variations :

- 1 kilogramme of bread (of pure wheat flour) ;
- 0.3 kilogramme of fresh meat (beef, mutton or pork) ;

0.12-0.15 kilogramme of dry cooking foodstuffs (haricot beans, rice, lentils, peas, semolina, etc.); or
0.4-0.75 kilogramme of fresh vegetables (vegetable marrows, spinach, beans, cabbages, kale, potatoes, etc.);
0.02 kilogramme of fat or oil ;
0.056 kilogramme of condiments, various (salt, pepper, flour, vinegar);
0.04-0.115 kilogramme of hot drink for the midday meal (coffee, tea, soup, etc.).

The above quantities of all these products taken together represent some 3,500 calories.

In addition to these normal and regular daily rations, provision is made for the supply of improved rations (additional meat, fat or cooked foods), or for the distribution of supplementary rations (pies of all kinds, tinned meat, cheese, etc.), in certain exceptional cases—*e.g.*, in connection with epidemics, or at times when specially severe labour is required on fortifications, ships, etc.

A variety of national dishes is prepared from the foodstuffs above mentioned.

CHAPTER V.

MEASURES TO ENABLE PARTICULAR CATEGORIES OF CONSUMERS TO OBTAIN FOODSTUFFS AT REDUCED PRICES.

The present section will be confined to mentioning a few cases in which public authorities or private undertakings take steps to enable a category of consumers to obtain goods at reduced prices. It will not attempt to review systems of price control in general.

{ Union of South Africa. }

SCHEME FOR ENCOURAGING CONSUMPTION OF SURPLUS MILK AND BUTTER.

The dairy industry of the Union of South Africa has expanded very considerably during the past few years, and production has evinced a consistent tendency to increase. The outcome has been that the stage of surplus production was reached some years ago, and, in order to ensure a reasonable return to the producer, steps had to be taken to remove the surplus from the inland market.

Legislation was therefore enacted in 1930 to provide for the establishment of a Dairy Industry Control Board, which was vested, *inter alia*, with the power of determining what quantities of butter and cheese should be exported compulsorily from time to time under a system of bounty, in order to relieve the internal market from the depressing effect of the surplus production, with due regard to the Union's own requirements. The Board was at the same time also

empowered to make all possible efforts to increase the local consumption of dairy products.

In view of the ever-increasing production of dairy products, the comparatively low level to which the prices had declined on the oversea market, the fact that indigent persons in the Union could not always afford to buy sufficient quantities of these health-promoting foods, especially during periodic droughts when scarcity sometimes obtained, and the fact that the efforts of the Board to increase local consumption met with little success, the Government decided, in 1935, upon an attempt to stimulate internal consumption of dairy products in a direct manner by means of a State-aided butter and milk scheme.

Whilst the scheme will undoubtedly augment the local outlet for dairy products, it is still largely in the nature of an experiment, the effects of which are difficult to predict. That it cannot absorb the surplus of the dairy industry is clear; nor is it without elements of danger, inasmuch as the presence of supplies in excess of those which can be absorbed by competitive demand tends to depress local price-levels.

On the other hand, the plan has two advantages, since, while ensuring a supply of health-promoting food to the indigent section of the Union's population, it presents an opportunity to approach the marketing problem from a new angle—namely, that of subsidising local consumption instead of export.

To finance the scheme, the Union Parliament voted £93,000 for the financial year 1935-36, and it is expected that a considerably larger amount will be placed on the estimates for 1936-37.

The administration of the scheme has been entrusted to the Dairy Industry Control Board, and falls into two parts :

- (1) The distribution of milk and cheese to children; and
- (2) The distribution of butter to charitable institutions.

Milk and Cheese.

The arrangements for the distribution of milk and cheese are briefly as follows :

1. The milk used is, as far as possible, drawn from existing supplies now used in rural areas for cheese and butter, and, in urban areas, from the surplus milk on the liquid market.
2. In certain areas and at certain times, it is difficult to provide milk. In such cases cheese, otherwise intended for export, is rationed to children.
3. The quantity of milk supplied to each child is limited to not more than half a pint per day; in the case of cheese, to one ounce per child per day.

4. The milk or cheese is supplied on every school day of the school year.

5. The milk is delivered at the schools, and is usually distributed amongst the children before or during the morning break, and is consumed at the time of supply. Where facilities are available, only pasteurised milk is used.

6. The scheme applies to all children in primary classes and to indigent children in secondary classes. Milk is also distributed to pre-school children through charitable organisations.

7. The parents of schoolchildren who are in a position to do so are expected to contribute 2s. per quarter towards the cost of milk supplied to each of their children. Payment is, however, not obligatory.

8. It is estimated that at present about 100,000 children are receiving a daily ration of milk and about 100,000 a daily ration of cheese. It is further estimated that, as soon as the scheme is in full operation, about 350,000 children will benefit in this way.

Butter.

The distribution of butter through charitable organisations, which are normally unable to buy such products at ruling market prices, is encouraged by making supplies available at low cost :

1. Charitable institutions and organisations approved by the Board are supplied with butter for consumption, or distribution, at a price of 9d., 8d. and 7d. per pound for first, second and third grade butter, respectively, over and above any quantity purchased by such institutions and organisations in the ordinary course.

2. Butter is supplied free or at a lower rate than mentioned in paragraph 1 to such charitable organisations of a specially deserving nature, as may be approved by the Board.

3. If it appears that any deserving institutions, such as schools, hostels and hospitals, etc., are prepared to take butter in excess of the quantities normally consumed by them, such additional butter is supplied to them at export parity price—*i.e.*, the price which such butter would have realised had it been exported.

4. The cost of carrying out the above scheme is borne by the Union Government. The Dairy Industry Control Board, however, contributes an amount equal to that which it would have been obliged to spend in bounty on such butter had it been exported, less the cost of administration and less a reasonable margin to cover the risk of any such butter finding its way into ordinary trade channels, in displacement of normal sales.

It is estimated that, on the present basis, about 750,000 lb. of butter will be distributed under this scheme, and, according to reports, it is giving very satisfactory results, especially in respect of the supply of milk to schoolchildren.

United Kingdom.

In the exceptional circumstances of the war, it was found necessary to introduce by gradual stages a wide system of State control of food supplies and prices and of the machinery of food distribution. The system that was evolved was peculiar to the special conditions of the war and was gradually liquidated after the termination of the war ; but the general increase of prices which took place during and since the war, and the greater instability of prices in the years immediately following the war as compared with the pre-war period, left public opinion keenly sensitive on questions relating to prices charged for the necessities of life.

The Profiteering Act of 1919 gave the Board of Trade power to investigate prices, costs and profits of articles of common use, and to fix maximum prices, and made the charging of prices giving unreasonable profits an offence punishable by fine or imprisonment. This Act, as amended by subsequent Acts, remained in force for a period of less than two years. Under the Acts, the Board of Trade was enabled to establish local profiteering committees and to delegate their powers, except powers of price-fixing, to those committees. A number of enquiries were made by Standing Committees appointed under the Acts into various trades dealing with food and other commodities. Summarising this experience in his book on "British Food Control", Sir William Beveridge stated that the total number of complaints investigated by the 1,800 profiteering committees during twenty months for which the Act operated was 4,700, and, of these, 75% were dismissed as irrelevant.

In December 1922, the Minister of Agriculture and Fisheries set up an important enquiry into the distribution and prices of agricultural products by appointing a Committee, under the Chairmanship of Lord Linlithgow, "to enquire into the methods and costs of selling and distributing agricultural, horticultural and dairy produce in the United Kingdom, and to consider whether, and if so by what means, the disparity between the price received by the producer and that paid by the consumer can be diminished".

The Committee produced, in 1933, reports on milk and milk products, fruit and vegetables, meat, poultry and eggs, cereals, flour and bread and a final report. In its final report, the Committee emphasised the need for continuous investigation into food marketing and distribution. It said that its investigations had led it to the conclusion that the spread between producers' and consumers' prices was unjustifiably wide. "Taken as a whole, distributive costs are a far heavier burden than society will permanently consent to bear."

In November 1924, the Royal Commission on Food Prices was appointed under the chairmanship of Sir Auckland Geddes. The Commission made a report in April 1925, which contained, in addition to a general section on food prices, sections containing the results of their investigations into bread, flour, wheat and meat. The Commission

recommended the establishment of a Food Council, and, in view of this recommendation, it did not extend its enquiries to other commodities, as it thought that the Food Council might carry on that work.

The Food Council was appointed by the Prime Minister in July 1925 to consider questions relating to the supply and price of articles of food of general consumption. It is not a statutory body and has no compulsory powers. It has made *ad hoc* investigations from time to time into various commodities, and its reports have been published. One example of its work is found in the drawing-up, after enquiries into bakers' accounts, of a scale of maximum bread prices in relation to flour prices. While this scale is not universally observed, it is generally followed by the London bakers' associations and sets a standard for bread prices in other parts of the country.

The Council has produced twenty-one reports, of which nine have been concerned with bread, one with flour, three with milk, two with tea, two with meat, one with fish and one with market-garden produce.

Reference may be made to an experiment in the distribution of potatoes at special prices conducted by the Potato Marketing Board in Bishop Auckland. This Board, the authority which regulates the supplies of potatoes in the United Kingdom, decided, in January 1935, to undertake a short local experiment in the distribution of potatoes in order to test the possibility of disposing of surplus supplies at specially low prices for consumption by necessitous families in such a way as not to disturb the normal operations of retail trade. Bishop Auckland, a small town in the coal-mining area of County Durham, where the greater part of the population are workers with small incomes and where unemployment is severe, was selected as a suitable centre. Vouchers were issued through the Employment Exchange to those who were unemployed or receiving public assistance, and these entitled the holders to purchase potatoes for domestic use at a favourable price.

It was fully realised that the restriction of the benefits to unemployed persons was artificial, that a number of those who were in employment and who had a large number of dependents might be living at as low a level of income. But the Board was primarily concerned, not with social relief in Bishop Auckland, but with an experiment to ascertain facts, and the restriction referred to provided an easy means of identifying a large number of those whose purchasing power was at a low level. Moreover, information was available regarding their number and the dependents of each man's family, while the fact that every one of them called once or twice weekly at the local Employment Exchange facilitated contact and communication. The town of Bishop Auckland contains some 19,000 persons, and there are approximately 5,000 male insured workers. Of this number, 2,437 (48%) were unemployed and they had 1,594 adult and 2,205 juvenile dependents, making 6,236 in all. To these persons (representing 33% of the population) a supply of potatoes was

made available for eight weeks (February, March 1935) at a specially reduced price. To qualify for this supply, prospective purchasers had to obtain a voucher from the Employment Exchange, visit a local retailer to get this voucher stamped, then proceed to a central warehouse, taking their own bag or other container, and pay cash.

The reduction in price was 3*d.* per 14 lb. from an existing price of 7*d.*, already an abnormally low price. Thus, a family consuming 21 lb. weekly would save the difference between 10½*d.* and 6*d.*, or 4½*d.* per week. The quantities in which these cheap supplies were available were limited to each family as follows :

	Lb. per week
For men with wife and 1 child	21
For men with wife and 2 to 4 children	42
For men with wife and 5 to 8 children	63

Of the full number of 20,929 vouchers issued by the Employment Exchange, 19,405 were utilised.

During the period of the experiment, the normal sales of potatoes in the retail shops fell by 40%, but the total consumption in the whole area rose by no less than 96%. Even if allowance is made for the stocks left on hand and for the fall in sales by fried-fish shops, the increase is still 69%.

This experiment definitely showed that, in a town having a high proportion of low-level incomes, and even at a time when prices were already exceptionally low, the consumption of an article like potatoes, the demand for which is usually regarded as inelastic, is, under certain conditions, responsive to a fall in price to a remarkable degree. The experiment also showed that, if there are cheap surplus supplies available which it is desired to dispose of without disturbing the general price structure, it is possible to devise machinery whereby the retailers' contact with their consumers is maintained, even if such supplies are not sold from their existing shops.

Bulgaria.

In Bulgaria, the Directorate for the Purchase and Export of Cereals, by fixing for agricultural products prices which, though not very high, are at all events stable, has safeguarded the rural population against price speculation and thus banished one very serious danger that threatens every agricultural producer—the danger that he may be obliged to sell his products for a song. On the other hand, thanks to the granaries established by the Directorate throughout the country and to the agricultural co-operative societies, the rural population, when threatened with famine after a poor harvest, can obtain effective assistance either through the Agricultural and Co-operative Bank or through the "Public Calamities Fund". Assistance is in the form of cereals, which are distributed for consumption or sowing.

Czechoslovakia.

On July 20th, 1935, the Government of Czechoslovakia stated that it would take steps to prevent any advance in the price-level of flour and bread. The various State departments at once ascertained the prices of flour paid on July 15th, both wholesale and retail, and these prices served as a basis for the publication of the maximum prices of flour in the different districts. The fixing of prices had another advantage—*i.e.*, the various grades of flour were to some extent standardised. Flour-mills were thus prevented from increasing their sales by offering products of an inferior quality at a lower price. Prices have been kept at the same level because the Government authorised the Czechoslovak Wheat Company to supply the mills with sufficient quantities of old wheat and rye at a reduced price. This made it impossible for the millers to raise their prices.

The price of bread was stabilised by similar means, thanks to the establishment of the Millers' Union, which helped to keep the prices of flour uniform.

It was also found necessary to arrange for a sufficient supply of potatoes at a low price. A large quantity is used for the manufacture of alcohol. In order to ensure an adequate supply for the population, when the potato crop was rather less plentiful than the average, a part of the barley stocks were sent to the alcohol distilleries, and a large part of the potato crop was thus kept for direct consumption. The stability of the market price-level was ensured by an arrangement with producers; after September 15th, there was practically no fluctuation in the price of potatoes in the agricultural markets, although the crop was 20% or 30% smaller than last year's crop. The quantity of potatoes required for the unemployed was set aside by the association for the marketing of potatoes, and an increase in prices in the various districts where the demand is greatest and prices are most likely to rise was thus prevented in the interest of the unemployed, who would otherwise have had to do without potatoes. This association arranged for potatoes to be supplied to the poorest classes of the population at cost price. To prevent heavy transport charges on potatoes for the unemployed, the Ministry of Railways made a reduction of 40% on those consignments; 3,000 truck-loads—*i.e.*, 10,000 kilogrammes of potatoes—were thus obtained for the unemployed. The quality of the potatoes was satisfactory in the case of the first 2,000 truck-loads; 14,000 truck-loads were stopped because the quality did not come up to the required standard.

Various measures have been taken to ensure an adequate supply of meat and animal products for the unemployed; in particular, imports of fatted pigs have been increased considerably. During the first ten months of 1935, 155,000 fat pigs were imported, whereas during the whole of 1934 only 80,000 entered Czechoslovakia. Although these imports were prejudicial to the interests of home producers, the Government did not hesitate to take this step in order that the price-

level of animal products might be kept comparatively low. For the same reason, the import duty on pork fat was reduced to 90 crowns for raw pork fat and 120 crowns for lard, the normal import duty being 360 crowns per 100 kilogrammes.

France.

AGRICULTURAL PRODUCTION ASSOCIATIONS.

Agricultural production co-operatives and syndicates are now devoting special attention to quality. In the matter of vegetable products, the National Federation of Co-operatives and syndicates of fruit-growers, market-gardeners, horticulturists and producers of other agricultural products has recently, for the purpose of improving and supervising quality, adopted a series of measures which have proved effective from the outset.

These measures are of two kinds : general, with a view to establishing liaison with certain national organisations having a specified range of action ; and particular, in that they are peculiar to the co-operative movement itself.

As examples of the first category, we may mention the increasingly close co-operation with the National Federation for the campaign against farm and garden pests. The joint study of increasingly important documentary material greatly facilitates the campaign against these pests by the institution of better methods of defence and the growing of good-quality fruit and vegetables.

As a national measure, the National Federation of Co-operatives has created a national mark which is affixed to goods packed in co-operative workshops. These workshops are subject to supervision as regards methods of packing, and the mark is granted as a reward for the maintenance of satisfactory conditions.

The extension of this practice has been made possible by the establishment of central co-operative packing-stations working for numerous producers in neighbouring communes or for syndicates.

Various enquiries have shown that a regularly uniform packing cannot be obtained in small or homecraft industries, and that a mark will only engender confidence when it stands for some regular and reliable method of work in connection with a large volume of important products.

As a result of this effort and the relations which have been established with consumers' co-operatives, only those producers' co-operatives which accept the control of the National Federation are allowed to tender to the wholesale warehouse of the co-operatives of France.

It should also be mentioned that the National Federation advises its affiliated groups regarding the choice of fruit-trees for planting, the choice of varieties, the distribution of grafts and second grafting. Finally, the creation of syndicates for the defence of appellations of origin also provides a possibility of protecting quality.

In the matter of products of animal origin, the agricultural co-operatives and syndicates have also been very active. Live-stock breeding syndicates have, by the introduction of pedigree registers, contributed to the improvement of stock. Numerous steps have already been taken to improve French live-stock. The Law of July 7th, 1933, on bovine tuberculosis applied through the intermediary of agricultural co-operatives, has made it possible to put a stop to the use of, or dealings in, tuberculous cattle. The main result of this will be healthier meat and milk.

In the matter of milk products, the efforts of the production associations have achieved incontestable results. The quality of the milk delivered for consumption and its purity have been very appreciably improved. The quantity of good milk produced has also increased. The filtering and pasteurisation of milk and cream, payment according to fat content, the establishment of markets and the development of supervisory syndicates for dairy products show what great progress has been made.

In the case of vinicultural co-operatives, better wine-making methods have secured similar results.

CONSUMERS' CO-OPERATIVES.

These voluntary associations of consumers are in a unique and privileged position, in that they are in direct and permanent contact with their members, whose needs they know and whose tastes they can form.

Already on their own initiative they have endeavoured to improve the standard of living of their members and, in particular, to ameliorate the conditions of nutrition.

The consumers' co-operative societies have employed divers methods to achieve this purpose. In the first place, they have sought to increase the purchasing power of their members by reducing overhead expenditure in such a way as to enable them to allow considerable discount. Moreover, by the improvement of commercial methods, good quality products are supplied to members. Group purchases are made by the wholesale house of the co-operatives of France. The introduction of a registered trade-mark that may be used if the quality and the make-up of the goods is satisfactory constitutes and even greater guarantee for consumers.

Finally, this system has made it possible, through the intermediary of small branches, to reach even the most remote country districts and thus bring to the rural population products formerly unknown or delivered under unsatisfactory conditions.

PRIVATE TRADERS.

Industrial and commercial concerns have in their respective domains seconded the efforts to improve the conditions in which foodstuffs reach the consumer.

The reduction of overhead expenses and diminution of waste makes it possible, as a result of lower selling prices, for greater numbers of the less wealthy citizens to procure more abundant foodstuffs in greater variety.

Moreover, a wider choice of products, improvements in the way in which these products are offered to the public, the possibility of purchasing smaller packets, etc., the good name acquired by the quality of a large number of national trade-marks—we need only quote, for instance, the production and preservation of milk products, pork-butchers' wares, biscuits, chocolates, etc.—also help, in some cases, to stimulate consumption.

A large part of the population now possesses a far wider marketing range than hitherto, particularly in rural and industrial districts, and these facilities are constantly being extended through the wholesale trading organisations which supply retailers in small townships and country districts, and through the close network of stores or branches founded by general food supply firms and chain store organisations, which were the real initiators of this system of distributing a large variety of products widely throughout the country.

The policy of the trade associations and federations in the food branch, which is co-ordinated by the National Confederation of the Food Trade and industry, is to reduce as far as possible the overhead charges and costs of foodstuffs before they reach the public and to see that the poorer classes obtain the benefit of abundant production.

Italy.

FOOD AND WAGES.

The problem of the diet of the working-classes calls for practical measures of various kinds which find their natural field of development in the trade unions and corporations. Generally speaking, two different policies have been followed. When, as occurs under many agricultural contracts, part of the wage is paid in products directly used to feed the labourer, efforts to improve the dietary are made through the trade unions on the basis of the collective contract. If, on the other hand, even though a money wage is paid, the terms of employment involve the consumption of meals on the employers' property, it is a common custom in agricultural work for the employer to supply all or part of the worker's meals. In such cases, several collective contracts lay down rules for the protection of the worker's interests as regards the quality and price of the food supplied.

CONTRACTS STIPULATING PAYMENT OF PART WAGES IN KIND.

This is a very important form of contract. Under it, not only does the worker, as it were, share in the production in order to enjoy certain benefits but he has also the possibility of using for himself and his family the part of those products which he received as wages and which

are usually staple commodities. The consumption of these products, therefore, means a considerable saving to the worker on the amounts which he would otherwise have to spend on buying them.

Of the numerous collective contracts of this class, mention may be made of that enacted for the Province of Turin.

CONTRACTS STIPULATING THE SUPPLY OF FOOD.

Many collective contracts stipulate the supply of food to agricultural labourers. There are rules under which the employer must give the labourer a certain daily ration of wholesome, nourishing and good-quality food. These measures aim at guaranteeing the worker a sufficient supply of food capable of giving him the necessary energy to do his work, and at the same time protecting him from possible abuses as regards the quality of the foodstuffs supplied.

Contracts of this are stipulated, for instance, for labourers engaged in the rice harvest; under such contracts, the employer, in addition to a money wage, also supplies the food. On holidays, the employer pays the whole cost of the food, while on working-days the cost is borne by the labourers, the employer deducting (1 lira) from the wages.

In addition to the supply of food, measures have been taken on the initiative of the "Ufficio Nazionale Monda" to set up hutments, convenient and healthy shelters, refectories and day nurseries for the children of working mothers. Thanks to these measures, men returning from work find their dinner ready in healthy and comfortable surroundings. As an example of this type of collective contract, we may mention that of the Province of Vercelli. Steps have likewise been taken to organise the supply of food to shepherds, and particularly those moving about from one pasture to another. Similar measures have been adopted in the case of workers employed in oil-mills and on the harvesting and threshing of wheat, etc., for whose benefit the supply of food, wholly or partly at the employer's expense, has been made compulsory.

Under almost all these contracts, provision is made for the supply of wine in moderation—that is to say, in quantities sufficient to make the meal wholesome and complete.

"MÉTAYAGE".

To enable workers' families to secure the best possible nutrition, efforts are being made to do away with the employment of agricultural workers as day labourers and the more general adoption of the *métayage* system of husbandry, by which the conditions of workers and their families are improved, not only because it ensures the necessary minimum of subsistence and stability, but also because it gives workers a direct share in the products of their labour, foodstuffs included. The gradual extension of the *métayage* system, which has long been

established in the fertile regions of Central Italy, has been effected either through the adaptation of the systems obtaining on land already under cultivation or through its application to the agricultural workers who, with their families, have been settled on the land made available by the immense work of land reclamation undertaken and carried out by the Fascist Government under the name of "total reconditioning".

FAMILY ALLOWANCES.

In the last place, the desire to improve the nutrition of workers, suggested another measure of a general character which deserves mention: the introduction of "family allowances" through which workers' wages, instead of following an invariable and identical scale for all those belonging to the same category, is increased in proportion to the size of the families which they have to support.

MODERATING INFLUENCE ON FOODSTUFF PRICES.

In Italy, the possibility of increasing the purchasing power of workers in general through measures to keep down the cost of foodstuffs is an aim which is pursued by the combined efforts of the State and the various corporative organs.

CONTROL OF PRICES IN GENERAL.

The regulation of the prices of staple commodities is effected by the competent corporative organisations and by the Fascist Party in such a way as to prevent abuses and excessive price increases, while at the same time guaranteeing an equitable profit to all economic interests.

Such regulation is achieved in two ways:

(a) By fixing maxima for the retail prices of the chief articles of food (bread, flour, pastes, meat, oil, butter, cheese, dried fish). These maxima are fixed periodically (as a rule, every fifteen days) by authorities set up in accordance with the corporative principle—that is to say, by provincial intersyndical committees, which base their decisions on the information and cost prices indicated by a central price committee presided over by the secretary of the Fascist Party and made up of representatives of all the employers' and workers' confederations;

(b) By the discipline of the members of the various commercial categories grouped in their syndical organisations.

It is, indeed, the traders' syndical organisation which follows price movements, and, on detecting excessive or unwarranted rises, intervenes either by persuasion or disciplinary action or by requesting the Government to take the appropriate economic measures.

CORPORATIVE ACTION WITH REGARD TO PRICES AMONG FACTORY WORKERS.

To the Government belongs the credit of having broken in Italy the vicious circle of wage increases consequent upon price increases, and price increases consequent upon wage increases, while at the same time endeavouring to reduce the cost of living. This action, which was carried out by the Confederation of Industry, with Government encouragement, began early in 1925 with the creation in all industrial centres of industrial supply organisations and stores serving one or more factories. Approximately one thousand firms are connected with the industrial supply centres at Milan and Biella, which have an average monthly turnover of ten million lire.

FACTORY STORES.

The monthly turnover of factory co-operatives and co-operatives common to several undertakings reaches approximately the same total. The influence of such stores on local prices is immediate and appreciable. According to the calculations of the meeting of statistical experts at Milan in July 1920, the savings thus effected each month by a working-class family of five persons (two adults and three children) on the fifteen most essential articles of food amounted to 142.50 lire during the first year of operation of one of the above-mentioned industrial supply organisations.

These factory stores, which were set up during an abnormal period in our economic development, still exercise a steadying influence on the market and are widely and freely patronised by their special public. They have, indeed, become implanted in the habits of working-class families, whom they supply with good quality goods at reasonable prices. There are at present approximately 2,500 undertakings which have their own stores or which are connected with industrial supply organisations.

FUNCTION OF CONSUMERS' CO-OPERATIVES.

The development of the consumers' co-operative movement in Italy is closely connected with certain special conditions governing the food supply. The latter presents different aspects, both hygienic and economic, according to whether it affects agricultural or industrial centres and an agricultural or industrial population.

The agricultural population needs a frugal but wholesome diet, which is excellent in the *métayage* areas but is more modest in the districts in which the system of daily hire and paid agricultural labour prevails. In all cases, the nutrition of the agricultural population is exclusively based on local agricultural produce, except in the mountain districts.

The importance of the consumers' co-operative movement, on the basis of the sales per head of the population, is therefore greatest in the industrial provinces. It is less marked, on the other hand, in the

Marches, Umbria, Latium, the Abruzzi and the whole of southern Italy, Sicily and Sardinia.

In the mountain districts, where it is more difficult to supply the population with food, and where, owing to their situation at a distance from the main routes of traffic, commercial competition is less keen and capitalist commercial speculation is easier, the consumers' co-operative has an extremely important double function : the technical function of improving supplies by the substitution of co-operative initiative for individual and capitalist initiative, which is found to be inadequate ; and the economic function of eliminating speculation, which is easy in connection with the distribution of foodstuffs.

EFFECTS ON THE MARKET PRICE.

The Italian consumers' co-operatives really succeed in reducing the cost of foodstuffs and increasing the relative purchasing power of workers' wages. In support of this assertion, it may be added that, in order not to confine their economic action solely to their members, they also sell to non-members ; and they aim at selling at the lowest possible price rather than at paying dividends to their members in proportion to purchases made during the financial year.

The sums which the Italian co-operative societies distribute at the end of the year to consumers in proportion to their purchases are modest. Members are rarely paid more than 2% on their purchases ; but the profit derived by consumers from prices below those usually prevailing in trade is much greater.

THE " PROVVIDA ".

Lastly, mention should be made, in connection with the regulation of prices, of the part played by the consumers' co-operatives and the " Provvida ", an organisation for the supply of foodstuffs administered by the Ministry of Communications.

The special food administration, " La Provvida ", was instituted by Royal Decree dated March 5th, 1925, under the authority of the Communications Ministry, for the purpose of taking over and improving the activities hitherto entrusted to several co-operative societies of minor importance which existed among the staff of the Ministry.

The aims of La Provvida are :

- (1) To lower prices by offering staple foodstuffs direct to the consumer, by eliminating costs of middlemen, advertisements, etc., which burden ordinary commerce, and the excessive profits (frequent in numerous cases) of the speculator ;
- (2) To ensure for increasingly wide circles of the population a supply of hygienically supervised foodstuffs, thus indirectly combating the growing use of substitutes and counterfeits, and the substitution of goods of inferior quality at the moment of sale ;
- (3) To perform charitable and relief work by setting aside for these purposes the greater part of the net profits,

Constituted on this basis, the "Provvida", which began operations with two retail shops, had 327 all over Italy by June 30th, 1935. The sales of these shops to consumers amounted to 3,700,000 lire in 1924-25 and 264,063,434 lire in 1934-35. They sold 567,000 kilogrammes in 1924-25 and 92,667,499 kilogrammes in 1934-35.

During these ten years, the "Provvida" paid a total of 44,000,000 lire to charitable organisations. It now possesses a complete organisation for supplying the population, and its development is deliberately kept within reasonable limits so as not to injure free trade; but, as any member of the "Dopolavoro" may buy at the "Provvida", it represents all that a Government can do under a system of entirely free trade to give the masses an opportunity of buying food of excellent quality at a moderate price.

These direct results of the institution and the necessity of taking into account the competition of free trade, as well as the indirect pressure exercised by the possibility of a greater development of the "Provvida", contribute to a remarkable degree towards regulating the trade in foodstuffs by providing a hygienic and cheap diet for the less well-to-do classes and by protecting them against those artificial shortages of goods which, when created in regard to staple foodstuffs, have very serious effects on the general welfare.

Netherlands.

Netherlands East Indies.

In normal times, neither the Government of the Netherlands Indies nor the local authorities take practical measures to distribute foodstuffs to various groups of the population. If necessary, they are distributed by charitable organisations. In cases of famine due to the failure of the rice crop, the deficiency is made good by the import of rice from Siam, India or Indo-China. The imported rice is distributed at a low price or free of charge to the population of the districts affected by the famine. These cases are exceptional, and the distribution of foodstuffs is purely local and temporary.

Poland.

In Poland, the Decree of the President of the Republic on "the supplying of the market with staple commodities" is the basis for control of the prices of the most important articles of food. The daily prices must be approved by the administrative authorities, whose aim it is to put down speculation. All the essential foodstuffs—bread, meat, sugar, fat, dairy produce, etc.—fall within the scope of this law.

Improvements in the food of factory workers are mainly due to the private initiative of the concerns which organise, in factories and workshops, kitchens and restaurants where meals are issued to the staff either free of charge or at a low price.

Switzerland.

In several Swiss towns there are popular kitchens—some of them very old-established—frequently financed by foundations of various kinds, which serve meals at cost price. In certain instances, the price is even further reduced through the assistance of voluntary workers, more particularly on the administrative side. Reference may be made to :

(a) The popular kitchens at Geneva, where a complete meal can be obtained for from 70 to 80 centimes ;

(b) The Société vaudoise de consommation at Lausanne which issues monthly cards at a cost of 30 francs, entitling holders to one full meal each day ;

(c) The workers' clubs, of which twenty-five have been founded in Switzerland, where a satisfactory meal can be obtained for from 40 to 50 centimes.

The Confederation grants a subsidy, to encourage the slaughter of cows for beef, to cantons and communes willing to supply the meat thus obtained to necessitous persons at reduced prices. In practice, this system is based upon the co-operation of stock-breeders, who sell their stock at low prices, while satisfying the requirements of the veterinary regulations ; of the butchers, who, in return for very small remuneration, undertake slaughtering, cutting-up and sale under official supervision, and, in the last place, of the general body of taxpayers, who bear part of the financial burden. It would appear that this system is likely to develop. The Canton of Geneva, for example, at present issues 40,000 vouchers, each representing 2 kilogrammes of meat, in the main to unemployed persons with families dependent upon them. The cost of such vouchers is 1.60 franc.

Uruguay.

Municipal departments are responsible for seeing that foodstuffs are sold at low prices. The cheapness of foodstuffs is a fundamental factor in Uruguay, where no problems of defective states of nutrition due to underfeeding arise and where, among sick children, in classical cases of inadequate and protracted artificial nutrition, it is exceptional to find clinical deficiency syndromes.

Yugoslavia.

PRICE VARIATIONS.

The price situation in Yugoslavia is highly complicated. Yugoslavia consists partly of rural producing and exporting areas and partly of areas and towns which have to buy their food, especially vegetables. Consequently, there is a great difference between the prices obtained

for wheat by the peasants who grow it in the north-east (the Vojvodina, which is the granary of the country) and by those in the west and south-west—Southern Croatia, Dalmatia, Bosnia, Herzegovina and Montenegro—who buy it from those more fertile areas. So wide is the difference that, in Montenegro, for example, the retail price of maize is 100%, and that of wheat 75%, more than in the producing areas.

Owing to the low prices of agricultural produce on the world markets, the Government is endeavouring, with the help of the Privileged Export Company, to keep them high enough for the Yugoslav peasants who work for the market to make a profit. The main reason for this is the wide gap between the prices of agricultural and industrial products in Yugoslavia. Notwithstanding these efforts, the gap is still very wide; for instance, the price of a Sack plough in Germany represents 3.30 quintals of wheat, whereas in Yugoslavia it represents 9 quintals of wheat.

From another point of view, however, the Government's policy of increasing agricultural produce prices would be against the interests of the people of the "passive" areas, whose economic condition is such that they could not maintain an adequate dietary even if prices were equal to those on the world markets.

There is also another point. Distribution is inadequately organised, and communications are bad, especially in the rocky and "passive" areas. The absence of consumers' co-operative societies is very seriously felt; they are hardly worth mentioning, except in the north-west (Slovenia), the only other important one being the Government Officials' Co-operative Supply Association, which has 80,000 members, representing with their families 300,000 people in all.

PRICE CONTROL.

In order to protect the consumers against excessive increases in the price of foodstuffs, the Law of November 5th, 1931, authorises the police to fix maximum prices for the retail sale of foodstuffs and articles of prime necessity in the shops concerned and for their consumption in cafés and restaurants. Retailers of articles of prime necessity and owners of cafés and restaurants must post up their prices in such a manner that they can be easily seen by the purchasers and guests.

For the same purpose, the law to prevent the high cost of living and illegal speculation, of December 30th, 1921, provides that any person selling foodstuffs in shops, on the market or in any other place must indicate the price of each article, either jointly or separately, in such a manner that the prices are visible to all.

Breaches of this provision are punishable by three months' imprisonment and a fine of 10,000 dinars.

The law prohibits the storing of foodstuffs with a view to withdrawing them from the market in order to raise prices; breaches of this rule are punishable by six months' imprisonment and a fine of 50,000 dinars.

The law prohibits sellers from asking a price higher than that which would provide a normal and legitimate commercial profit, which may not in any case exceed 25%. Breaches are punishable by three months' imprisonment and a fine of 10,000 dinars. Persons who give false measure or reduce the portions of foodstuffs for sale are liable to the same penalty.

Multiple resale and illicit speculation intended to increase the price of foodstuffs are forbidden, as well as any agreements between producers or middlemen with the object of raising the price of goods. It is forbidden to re-purchase foodstuffs which have already been sold on the same market the same day. Merchants and dealers must effect their sales and purchases for the purpose of providing retailers with fresh supplies after the hour fixed for retail sales at the same place.

It is forbidden to purchase from any person carrying foodstuffs to the market and selling them on the way with the intention of depriving the market of the goods, or reducing the quantity offered for sale in order to raise prices.

Large fines are imposed for breaches of these rules.

CHAPTER VI.

MEASURES FOR ENSURING THE QUALITY OF FOODSTUFFS.¹

The State intervenes in nutrition by the institution of a public service for the prevention of adulteration and the supervision of the quality of foodstuffs.

Argentine Republic.

The Health Boards of each province deal with problems relating to the supervision of foodstuffs, and two Food Codes have been promulgated: one for the province of Buenos Aires and the other for that of Santa Fé. The capital of the Republic submitted its Code for examination to a Commission set up two years ago by the Municipal Administration. Imported foodstuffs are supervised by the National Chemical Laboratory, and foodstuffs consumed in the City of Buenos Aires by the Municipal Chemical Laboratory.

Austria.

"CODEX ALIMENTARIUS AUSTRIACUS".

In Austria, the "Codex Alimentarius Austriacus" is intended to serve as a technical guide for the supervision of foodstuffs. The first edition was issued in 1891, in the time of the former Austro-Hungarian monarchy. A new edition of the Codex for Austria is nearly completed.

¹ See also the report published by the League in 1930: "Survey of the direct and indirect means at the disposal of foreign buyers to enable them, in a number of countries, to ascertain the quality of the goods acquired by them". Document C.624.M.246.1930.II.

The various parts of the nutrition code are classified on uniform lines. A list of legal provisions precedes each of the following chapters : (1) Description, (2) Taking Samples, (3) Testing (Analysis, etc.), (4) Findings, (5) Rules for the Trade, (6) Utilisation of Products not fit for Human Consumption.

The nutrition code has not the force of law, like a Government Decree, but provides a criterion for institutions responsible for examining and testing foodstuffs, both from the chemical and the health points of view, and is also often consulted by the interested branches of industry.

This code, which is kept up to date by means of supplements, is a basis for the uniform and effective supervision of the foodstuffs trade in Austria.

SUPERVISION OF THE TRADE IN FOODSTUFFS.

Transactions in foodstuffs in general are governed by the Foodstuffs Act of January 16th, 1896. The trade in margarine, wine and home-made wine is dealt with in special legislation (1901, 1925, 1929). On the basis of these Acts, numerous regulations have been issued relating to their enforcement.

Under the Foodstuffs Act, Government analytical institutes have been set up for the technical analysis of foodstuffs and certain commodities in general use. Such "Federal Institutes for the Analysis of Foodstuffs" now exist in Vienna, Graz and Innsbruck.

In addition, the Agricultural Chemical Experimental Stations in Vienna and Linz have been commissioned to act as special Government analytical institutes. Among provincial institutions may be mentioned the Carinthian Provincial Experimental and Analytical Institute for Foodstuffs at Klagenfurt and the Vorarlberg Provincial Chemical Experimental Institute at Bregenz.

The Government analytical institutes are obliged to make a technical analysis of foodstuffs and certain commodities in general use at the request either of the authorities or law courts or of private individuals, and to issue reports and expert opinions thereon. If, in this connection, an analytical institute suspects the existence of a criminal offence, it must notify the Public Prosecutor accordingly.

The Margarine Act enacts provisions for the trade in margarine, oleo-margarine and other artificial fats. It is forbidden, in particular, to market admixtures of butter and the above-mentioned fats, and it is further directed that margarine may be sold only if during manufacture a certain admixture is added for purposes of identification. Furthermore, the fats referred to may be marketed only in containers distinguished by a conspicuous coloured band marked with the name of the manufacturer and a description of the contents. In retail trade, the paper wrapper must also have the coloured band.

The provisions of the Wine Act aim at preventing the adulteration of wine, must and fruit-wine: but exceptions are made for fruit-juices, mead (honey-wine) and medicinal wines.

To meet the demand for specialists with academic and practical qualifications for performing independently the duties laid upon public analytical institutes by the Foodstuffs Act, the Ministerial Decrees of October 13th, 1897, August 1st, 1900, and May 24th, 1909, define the basic features of the curriculum to be followed and examinations to be passed by food inspectors.

Under the Ministerial Decrees of May 25th, 1908, and August 22nd, 1922, courses of study for the training of sanitary and food inspectors were opened at the Federal Institute for Foodstuff Analysis.

Belgium.

In Belgium, measures have been taken to regulate the sale of certain products available for consumers. The majority of these measures have been taken under the Royal Decree of February 26th, 1935, to ensure Fair Trading in Agricultural Products and Garden Produce, or under the Ministerial Order of May 21st, 1935, for the Regulation of the Sale of Certain Fruits and Vegetables.

The Ministry of Agriculture is responsible for the prevention of adulteration. The work is carried out through inspectors and assistant inspectors of the Service for the Inspection of Foodstuffs. In addition to their main duties—*i.e.*, the detection and punishment of food adulteration—these officials and agents assist by advice in the work of improving the standard of foodstuffs offered to the public.

United Kingdom.

In England and Wales, several statutes, and the regulations made under them, deal with the composition and purity of articles of food and drink. Their execution mainly rests with specified classes of local authorities. The Ministry of Health, however, exercises influence upon the administration of the statutes and regulations by such means as the issue either of circular or special letters of advice, and the publication of special reports. Further, under the Local Government Act, 1929, a comprehensive survey of the administration by local authorities of their public health services is periodically carried out by medical officers of the Ministry.

The principal provisions of the statutes and regulations which are mainly relevant in the present connection are briefly indicated below.

FOOD AND DRUGS (ADULTERATION) ACT, 1928.

This Statute, which consolidated a number of earlier Acts, contains two main prohibitions;

(1) The sale of an article of food which has to the knowledge of the vendor been rendered injurious to health ; and

(2) The sale to the prejudice of the purchaser of an article of food differing from that demanded.

By a further provision, a person prosecuted may plead as a defence, broadly speaking, that he purchased the article under a written warranty that it was such as was demanded by his customer ; that he had no reason to believe that it was otherwise at the time he sold it ; and that he sold it in the same state as when he purchased it.

The Act contains certain special provisions relating to milk, and also empowers the Minister of Agriculture to make certain regulations as to the constituents of milk, butter and other articles. It also contains a number of special provisions for the protection of the public against fraud in connection with the sale of butter, margarine and cheese.

Articles of food are not defined in the Act, with certain partial exceptions, and where no definition is prescribed by statute the decision whether a particular article falls within the definition of the name under which it was sold rests, in the event of a dispute, with the court of summary jurisdiction before which proceedings are taken. The court decides this on the evidence before it ; and its decision on the question of fact is not binding on another court. The result has, however, been that standards of composition have become generally recognised for very many articles. Reports on a number of special points in relation to the composition of food have also been made by the Ministry of Health. The recommendations made in these reports, though of course not authoritative in law, have to a large extent been adopted by the courts in deciding cases which have come before them.

The local authorities who enforce the Act must appoint public analysts, whose appointment and removal are subject to the approval of the Minister of Health. Enforcement is, in general, effected by means of the purchase of samples from a retailer by an officer of a local authority. The officer divides the sample into three parts, one being sent to the public analyst for analysis, one given to the retailer to enable him to have an independent analysis made, and the third retained so that it may, if necessary, be sent to the Government Chemist.

PUBLIC HEALTH ACTS.

(a) *Public Health Act, 1875, and Public Health Acts Amendment Act, 1890.*

Officers of the appropriate local authority may inspect and examine any article of food exposed for sale or deposited for preparation for sale for human consumption, and, if the article appears to be diseased, unsound, unwholesome or unfit for food, it may be seized and taken before a Justice of the Peace. The latter may condemn it and order

it to be destroyed or so disposed of as to prevent it from being used for human food. The vendor may also be fined or imprisoned.

These Acts also include provision for the erection of public slaughter-houses by local authorities, the licensing of private slaughter-houses, and the making of bye-laws for slaughter-houses.

(b) *The Public Health Act, 1925.*

Requirements are prescribed for shops, etc. (other than premises coming within the scope of Regulations under the Act of 1907 referred to below), where food is sold or prepared for sale relating to sanitation, ventilation and cleanliness, and requiring the occupier to take all reasonable steps to prevent risk of contamination to the food.

The statutes referred to in (a) and (b) above, do not apply to London, but similar measures are in force under special codes of legislation relating to London only.

(c) *The Public Health (Regulations as to Food) Act, 1907.*

This Act empowers the Minister of Health to make regulations for the prevention of danger to public health from the importation, preparation, storage and distribution of articles of food and drink intended for sale for human consumption. Several series of regulations have been made under the powers conferred by this Act and other Acts.

(d) *Public Health (Preservatives, etc., in Food) Regulations, 1925-1927.*

These regulations prohibit the addition of preservatives, as defined in the Regulations, to any article of food or drink, and the importation of food or drink containing added preservative, except within specified limits in the case of certain scheduled articles, some of which must be labelled to show the preservatives which they contain; restrictions are also placed on the sale of preservatives; and a further schedule contains a list of colouring matters which are prohibited.

(e) *Public Health (Condensed and Dried Milk) Regulations.*

An amendment to the Act of 1907 enabled the Minister to make regulations with regard both to the labelling of these articles and to the amount of milk-fat and milk-solids they must contain. Regulations for this purpose were made accordingly in 1923 (amended in 1927).

(f) *Public Health (Meat) Regulations, 1924.*

These Regulations contain requirements as to notices to be given to the local authority when animals are to be slaughtered for human consumption (so as to facilitate the work of meat inspection), and relating to other matters in connection with slaughtering. They provide also for a voluntary scheme of meat marketing, by the local authority's

officers, and they contain detailed provisions for cleanliness and avoidance of contamination of meat in shops and stalls, and in the transport and handling of meat.

(g) *Public Health (Imported Food) Regulations, 1925, and Amending Regulations, 1933.*

These Regulations make all imported foods subject to examination at the port of entry, and to seizure and condemnation if found to be unfit for human consumption. Further, it is an offence to import for sale for human consumption any article of food which has been examined by a "competent authority" and not found at the time of examination to be fit for human consumption. The Regulations also contain special provisions relating to imported meat (derived from cattle, sheep, swine or goats). The importation of certain kinds of meat is unconditionally prohibited and the importation of other specified kinds of meat is prohibited unless accompanied by an official certificate of the country of origin which has been recognised by the Minister as affording satisfactory evidence that the meat has been derived from an animal which was free from disease at the time of slaughter, and that it has been dressed or prepared and packed with all necessary precautions for the prevention of danger to public health.

(h) *Shell-fish.*

Contaminated shell-fish beds have been in several places brought under control either by orders made by sanitary authorities under the Public Health (Shell-fish) Regulations, 1915 (now replaced by the Public Health (Shell-fish) Regulations, 1934), or by special series of regulations applying to particular fisheries, made by the Minister of Health under the Act of 1907.

The general effect of the orders is that no shell-fish from the area concerned may be distributed for sale for human consumption unless they have been relaid in clean salt water for a specified time. The effect of the regulations is similar; they prohibit the sale of the shell-fish for human consumption unless they have been subjected to an approved process of sterilisation (heat treatment) or cleansing. Local authorities have power under an Act of 1932 to provide apparatus for cleansing shell-fish.

MILK STANDARDS.

Milk and Dairies Acts, etc.

Special provisions relating mainly to the cleanliness and safety of milk are contained in the Milk and Dairies (Consolidation) Act, 1915, the Milk and Dairies (Amendment) Act, 1922, and the Milk and Dairies Order, 1926. Their general object is to secure cleanliness in milk production and its freedom from disease, both bovine and human. Reference may be made more particularly to the following :

So far as the health and inspection of cattle are concerned, the administration of the Acts and Order rests with county and county borough councils ; in other matters with the local sanitary authorities.

The medical officer of health of a county or county borough may have the cows on any farm or dairy in the area examined by a veterinary surgeon if he suspects that tuberculosis is likely to be caused by the consumption of their milk, and he must do this if he receives a notice from the medical officer of health of another area in which the milk is consumed that tuberculosis is likely to be caused by such milk. Local authorities have power to stop the supply of milk if they have sufficient evidence that it is likely to cause tuberculosis.

It is also an offence to sell the milk of a cow which has given tuberculous milk or is suffering from certain forms of tuberculosis or from other specified diseases, if the vendor has received notice from an officer of a local authority or could, by the exercise of ordinary care, have known that the cow had given tuberculous milk or was suffering from tuberculosis.

Power is given to the appropriate local authorities to make routine veterinary examinations of all dairy cattle in their districts, and such examinations must be carried out by qualified veterinary surgeons.

A medical officer of health of a local sanitary authority has power to stop the supply of milk from a dairy, where he has evidence of infectious disease being attributable to the milk from that dairy. Further, if a medical officer of health suspects that any persons having access to milk or milk vessels are suffering from an infectious disease, or have recently been in contact with anyone so suffering, he may examine them and, if necessary, forbid them, for a specified period, to take any part in the production, etc., of milk.

The Public Health (Prevention of Tuberculosis) Regulations, 1925, contain provisions for preventing any person who suffers from tuberculosis of the respiratory tract from being engaged in connection with a dairy, in employment which involves the milking of cows or the handling of milk vessels ; and the Public Health (Infectious Diseases) Regulations, 1927, contain provisions for preventing the employment of carriers of enteric fever or dysentery infection in any trade concerned with the preparation or handling of food or drink for human consumption.

All persons carrying on the trade of cowkeeper or dairyman, and all farms and dairies, must be registered with the local sanitary authority, and the authority may refuse or revoke the registration of retail purveyors of milk if satisfied that danger to public health is involved.

The Milk and Dairies Order, 1926, contains detailed provisions for securing cleanliness in premises and methods, including requirements respecting the adequate ventilation and water supply of dairies and cowsheds, and provisions for the protection of milk vessels from contamination and the use of clean clothing by milkers and distributors. Other provisions relate to the construction of the floors of cowsheds

and to their cleansing and lime-washing, and requirements are laid down for preventing the contamination of milk in transit.

Under the Milk (Special Designations) Order, 1923,¹ a system has been set up by which licences are granted for the production and sale of milk under special designations. The special designations of milk at present are as follows :

Certified Milk. — Raw milk from cows which have passed a veterinary examination and a tuberculin test; it must be bottled on the farm, and not contain more than 30,000 bacteria per c.c. or any coliform bacillus in 1/10 c.c.

Grade A (Tuberculin Tested) Milk. — Raw milk from cows which have passed a veterinary examination and a tuberculin test; it may be bottled either on the farm or elsewhere. It must not contain more than 200,000 bacteria per c.c. or any coliform bacillus in 1/100 c.c.

Grade A Milk. — Milk from cows which have passed a veterinary examination; it may be bottled either on the farm or elsewhere. The milk may be raw or pasteurised; if raw, it must conform with the bacteriological standard for Grade A (Tuberculin Tested) Milk; if pasteurised, with that for Certified Milk.

Pasteurised Milk. — Milk which has been heated and retained at a temperature of 145° to 150° F. for at least thirty minutes and does not contain more than 100,000 bacteria per c.c.

It is unlawful to use any of these designations or any similar designation for milk unless the appropriate licence has been obtained.

Licences for the sale of milk under the special designations are at present granted by the Minister of Health to producers of Certified and Grade A (Tuberculin Tested) Milk; by county council and county borough councils, and in a few special instances by local sanitary authorities, to producers of Grade A milk; and by local sanitary authorities to pasteurising establishments and for graded milk sold from premises other than the place of production.

¹ Under the Milk (Special Designations) Order, 1936, operating as from June 1st, 1936, the designations "Certified" and "Grade A (Tuberculin Tested)" are replaced by the one designation "Tuberculin Tested" and the designation "Grade A" is replaced by the designation "Accredited". The designation "Pasteurised" is retained.

The conditions applicable to the production and sale of Tuberculin Tested milk are substantially the same as those for Grade A (Tuberculin Tested) milk; it is, however, permissible to pasteurise Tuberculin Tested milk and sell it as "Tuberculin Tested Milk (Pasteurised)". The conditions for Accredited milk are similar to those for Grade A milk, but, if pasteurised, the milk must be sold simply as "Pasteurised" milk.

The Minister of Health ceases to be a licensing authority and his functions in this respect are transferred to local authorities.

In Scotland, under the Milk (Special Designations) Order (Scotland), 1930,¹ a system which has been placed under the administration of local authorities has been set up for the granting of licences for the production of "Certified", "Grade A (Tuberculin Tested)", "Grade A" and "Pasteurised" milk. It is illegal to use any of these special designations or any similar designation for milk unless the appropriate licence has been obtained.

Certified Milk is raw milk produced from cows which have passed the double intradermal test for tuberculosis twice yearly and a clinical veterinary examination three times a year. The milk is bottled on the farm, must contain a minimum of 3.5% of butter-fat, and not more than 30,000 bacteria per c.c. or any coliform bacillus in 1/10 c.c. at any time before delivery to the consumer.

Grade A (Tuberculin Tested) Milk is raw milk produced from cows under similar conditions to certified milk, but it may be bottled on the farm or elsewhere. It must contain a minimum of 3.5% butter-fat and not more than 200,000 bacteria per c.c. or any coliform bacillus in 1/100 c.c. at any time before delivery to the consumer.

Grade A Milk is raw milk from cows which have passed a clinical veterinary examination not less than three times a year. It may be bottled either on the farm or elsewhere, may be sold raw or pasteurised, and must contain a minimum of 3.5% butter-fat. If sold raw, it must conform to the bacteriological standard for Grade A (Tuberculin Tested) Milk; if sold pasteurised, with the bacteriological standard for Certified Milk.

Pasteurised Milk is milk which has been heated and retained at a temperature of 145° to 150° F. for at least thirty minutes and does not contain more than 100,000 bacteria per c.c.

Bulgaria.

In Bulgaria, the Public Health Directorate, with the assistance of the veterinary authorities, exercises very strict supervision over the production of and trade in foodstuffs, so that the possibility of bad or adulterated products being sold is reduced to a minimum.

¹ Under the Milk (Special Designations) Order (Scotland), 1936, operating as from October 1st, 1936, the designation "Grade A (Tuberculin Tested)" will be replaced by the designation "Tuberculin Tested", and the designation "Grade A" will be replaced by the designation "Standard". The designation "Pasteurised" will be retained.

The conditions applicable to the production and sale of Tuberculin Tested milk will be substantially the same as those for Grade A (Tuberculin Tested) milk; it will, however, be permissible to pasteurise Tuberculin Tested milk and sell it as "Tuberculin Tested (Pasteurised)". The conditions for "Standard" milk will be similar to those for Grade A milk, but, if pasteurised, the milk must be sold simply as "Pasteurised" milk.

Denmark.

Denmark possesses a highly developed system of inspection of animal foodstuffs, especially dairy produce and meat products, as part of an effective campaign against animal diseases—in particular, bovine tuberculosis.

France.

The National Nutrition Committee¹ has collected information regarding the regulation and organisation of the supervision of foodstuffs. This information is intended to throw light on the means at the disposal of the public authorities for supervising the quality of the foodstuffs supplied to the general public and to persons belonging to various units (army, navy, educational establishments, charitable or public assistance institutions; hospitals, homes, asylums, sanatoria, etc.).

It has also studied what steps might be taken to render this supervision more effective.

The National Nutrition Committee has likewise considered what means could be employed, within the framework of the present organisation, by the public authorities or certain bodies to improve nutrition, both in quantity and in quality, and to give effect to the guiding principles laid down by the scientific committees.

LAWS AND REGULATIONS.

Regulations relating to the Fitness of Food for Human Consumption.

(a) *Governing Foodstuffs in general.*

The supervision of foods with regard to fitness for consumption is based on the *Law of April 5th, 1884*, on Municipal Organisation, Article 97 of which provides that :

“ The object of municipal administration is to ensure order, security and public health. It comprises, in particular . . . the inspection of goods sold by weight or measure to ensure that the correct quantity is supplied and of foodstuffs offered for sale to ensure that they are fit for human consumption.”

Moreover, under Article 99 :

“ The powers vested in the mayor shall not debar the prefect from taking, in respect of all communes in the department, or certain of them whenever no action has been taken by the municipal authorities, such steps as may be necessary to maintain public health, security and order.

“ This right may only be exercised by the prefect in respect of a single commune after the mayor has been ordered to take action and has failed to do so.”

¹ For the French National Nutrition Committee, see page 218.

These provisions have been reproduced in the Law on Public Health (February 15th, 1902, Article 2) and in the Law of August 5th, 1908.

Moreover, as regards the supervision of foodstuffs at Paris, the *Law of April 7th, 1903*, amending the Law of February 15th, 1902, stipulates that the Prefect of Police at Paris shall "continue to . . . ensure the application of the laws and regulations regarding the sale and offering for sale of foodstuffs which have been adulterated or are tainted".

(b) *Governing Certain Foodstuffs in particular.*

1. The first regulations in regard to the *fitness of meat for human consumption* are several centuries old. The main texts are as follows :

Old Laws :

- Edict of January 30th, 1350.
- Edict of December 19th, 1403.
- Letters Patent of Henri II (February 1587).
- Parliamentary Decree of March 28th, 1589.
- Parliamentary Decree of February 23rd, 1602.
- Letters Patent of June 1st, 1782.
- Letters Patent of August 26th, 1783.
- Order of September 2nd, 1806.
- Ordinance of March 25th, 1830.
- Law of March 27th, 1851.
- Law of July 21st, 1881.

Present Laws :

Under the *Law of June 21st, 1898*, communes were for the first time required to organise a service for the supervision of slaughter-houses, cattle-markets and knackers' yards. Although the sole object of these provisions was to prevent epizootic diseases, they have actually served as a basis for the establishment of meat inspection services in a large number of places.

The same law prohibits the offering for sale of meat obtained from animals suffering from cattle plague, glanders, anthrax, swine erysipelas and rabies (Articles 43 and 44).

The *Decree of October 6th, 1904*, lays down the conditions under which meat obtained from animals suffering from contagious pleuro-pneumonia of cattle (Article 32), tuberculosis (Article 47) and anthrax (Article 78) may be sold.

Article 477 of the Penal Code provides that damaged, tainted and harmful foodstuffs shall be confiscated and destroyed.

(*The Law of August 1st, 1905*, on the Punishment of Fraud applies to meat and meat products ; these two last-named texts are, however, general and relate to all classes of sales.)

The Law of January 8th, 1905, provided the communes with the means of organising the supervision of the wholesomeness of meat and the upkeep of public slaughter-houses, for which purpose taxes were introduced. These were amended by the Law of January 8th, 1921, and are as follows :

Meat prepared in a municipal slaughter-house, 0.05 franc per kg. net ;

Meat prepared in a private slaughter-house, 0.03 franc per kg. net ;

Meat coming from elsewhere, 0.03 franc per kg. net.

The circular of July 5th, 1908, emphasised the necessity for organising this supervision and requested the mayors to organise it in accordance with the provisions of the above-mentioned law.

The *Decree of August 24th, 1908*, deals with various details regarding the use of public slaughterhouses, and in the circulars of December 1st, 1908, and April 15th, 1910, the necessary instructions were given for the application of the Law of January 8th, 1905, and the Decree of August 24th, 1908.

The *Decree of July 18th, 1913*, provides the municipalities with the means of collecting the legal taxes by a simple method in places which have no scales—namely, the tax per head of slaughtered animals based on a scale included in the text of the Decree.

The circulars of June 27th, 1914, July 9th, 1917, and May 1st, 1923, contain further instructions for the organisation and exercise of supervision.

Under the *Law of July 7th, 1933*, the work of organisation, begun under previous laws, was continued, and meat inspection was made compulsory. For this purpose :

(a) The display, circulation, sale and direct or indirect use for human consumption of fresh and frozen meat not bearing the stamp testifying to its wholesomeness were prohibited (Article 12) ;

(b) The inspection of industrial slaughter-houses was entrusted to agents appointed by the Minister of Agriculture ;

(c) The prefects were required to take upon themselves the duties of the mayors and to inspect the meat in communes which have not considered it necessary to set up an inspection service ;

(d) Meat offered for sale without the necessary stamp was to be confiscated and sold for the benefit of the commune or the State.

The *Decree of September 29th, 1935*, lays down the conditions under which the law is to be applied and summarises these as follows :

“ No matter where the animal is slaughtered, no portion of the meat, offal and by-products may be exempted from inspection from the point of view of its fitness for human consumption.”

It is now the duty of the public authorities effectively to ensure the general inspection of meat offered for sale and they have the means of doing so.

2. *Purity of Milk.* — The regulations relating to the purity of milk date back to the Decree of March 25th, 1924, the main provisions of which are reproduced below :

“ A. The following may not be regarded as suitable for human consumption :

“ (1) Milk obtained from animals suffering from diseases, a list of which will be issued by Decree of the Minister of Agriculture after consulting the Advisory Committee on Epizootic Diseases ;

“ (2) Coloured, dirty or malodorous milk ;

“ (3) Milk obtained from an animal within one week after calving, and, in general, milk containing colostrum ;

“ (4) Milk obtained from ill-nourished animals which are obviously exhausted (Article 2).

“ B. Under Article 1 of the Law of August 1st, 1905, the possession without any legitimate reason, the display, offering for sale or sale for human consumption of milk which is unfit for this purpose, or milk obtained by mixing milk fit for consumption with milk which is unfit for that purpose (Article 3), are regarded as attempts to defraud the public.

“ Article 1 of the Law of August 1st, 1905, also prohibits the possession without any legitimate reason, display, offering for sale or sale :

“ Under the designation of pasteurised milk, of milk from which all pathogenic microbes have not been removed by a method approved by the Supreme Council of Public Health of France

“ Under the designation of ‘ sterilised milk ’, of milk containing live germs.”

In application of Article 2 of the Decree of March 25th, 1924, the Committee on Epizootic Diseases, after a lengthy and careful examination, proposed that the following provisions should be adopted :

“ (1) Milk obtained from animals suffering from one of the following diseases may not be regarded as fit for human consumption :

“ Tuberculosis,

“ Undulant fever,

“ Anthrax,

“ Symptomatic anthrax,

“ Gas gangrene,

“ Cattle plague,

“ Pleuro-pneumonia,

- “ Rabies,
- “ Cow-pox,
- “ Foot-and-mouth disease,
- “ Cachexia,
- “ Fever,
- “ A marked disorder of the lacteal secretion,
- “ Mammitis,
- “ Metritis,
- “ Enteritis,
- “ Poisoning,
- “ Pulp disease,
- “ Draff disease,
- “ Abscesses and furunculosis of the udder or teats.

“(2) In the case of undulant fever, anthrax, symptomatic anthrax gas gangrene, cattle plague, pleuro-pneumonia, rabies, fever, cachexia, a marked disorder of the lacteal secretion, mammitis, poisoning, pulp disease, draff disease, abscesses and furunculosis of the udder or teats, the milk may not be used for human consumption under any pretext and in any form whatsoever.

“In the case of tuberculosis, cow-pox, foot-and-mouth disease, metritis and enteritis, the milk, if it is perfectly normal in appearance, may be used for consumption after pasteurisation or sterilisation and subject to the reservations laid down in the last two paragraphs of Article 3 of the Decree of March 25th, 1924.”

This text has been submitted for examination to the Supreme Council of Public Health of France.

The *Law of July 2nd, 1935*, for the organisation and improvement of milk markets makes a further contribution towards the supervision of the purity of milk. Its chief provisions are given below :

(1) Milk for consumption or the manufacture of a milk product may only be offered for sale if it has been obtained from milch animals that are perfectly healthy.

(2) The Government shall grant a special stamp to producers who voluntarily accept official veterinary and medical inspection (Article 4).

(3) Milk sold raw must be sold direct by the producer to the consumer, subject to the reservations and conditions laid down in Article 5.

(4) Milk which does not comply with the provisions of Articles 4 and 5 of the Law may only be sold for human consumption if it has been properly pasteurised.

(5) Departmental milk committees may be set up by decree of the Minister of Agriculture at the request of the departmental committees concerned ; the functions of these committees are laid down in the circular of September 14th, 1935.

The body of provisions referred to above represents a decided advance, and an important step forward towards the compulsory supervision of the health of milch animals.

3. *Purity of Drinking-water.* — Article 1 of the Law of February 15th, 1902, provides that :

“ In every commune, the mayor is required, in order to protect public health, to draw up, after consulting the municipal council, and in the form of municipal decrees embodying health regulations :
“ . . . provisions relating to the supply of drinking-water.”

Article 10 deals with the protection of springs, wells and conduits conveying drinking-water from an underground sheet of water, and lays down conditions for the establishment of a protective zone.

Article 21 provides that “ the Departmental Health Councils and the Health Commissions must be consulted regarding . . . the supply of drinking-water to built-up areas ”.

Under Article 22 (amended by the Law of April 7th, 1903), the Prefect of the Seine is responsible for the catchment and distribution of the water.

In accordance with Article 24, the Prefect of the Seine is to be assisted in carrying out these functions by the Seine Public Health Council.

Article 25 provides that the Supreme Public Health Council shall deal with all questions affecting public health. It must in every case be consulted regarding public works for the supply of water to towns of over five thousand inhabitants. It is specially responsible for supervising the water supply of towns when the catchment area of such water lies outside the limits of their respective departments.

Lastly, Article 28 enumerates the penalties inflicted on persons who :

“ As a result of neglect or carelessness, defile public or communal works for the catchment or conveyance of drinking-water ; any person who, as a result of neglect or carelessness, allows excrement or any other substance harmful to health to enter spring-water, fountains, wells, tanks, pipes, aqueducts or public reservoirs shall be punished by the penalties laid down in Articles 479 and 480 of the Criminal Code.”

In accordance with this article :

“ Persons leaving the carcasses of animals, butchers' offal, manure, fœcal substances and animal residue in general which is liable to putrefy, in clefts, pits, swallets or hollows of any kind, other than the pits required by recognised establishments, shall be liable to the same penalties.

“ Persons voluntarily committing any similar act shall be liable to the penalties laid down in Article 257 of the Penal Code.”

4. *Fitness of Oysters and Shell-fish for Human Consumption.* — The conditions under which the fitness of oysters for human consumption is ensured are laid down in a *Decree of July 31st, 1923.*

At the time of transport, supervision is exercised in accordance with the following provisions :

“ Proof that the oysters have been obtained from healthy beds must be furnished to the agents responsible for supervision, at their request. For the purposes of this supervision, special documents must be attached to each package.”

Consignments of oysters to be put back into the beds are subject to the same formalities.

The supervision of the sale of oysters intended for consumption is exercised in accordance with the existing laws and regulations already mentioned in the present report :

Law of April 5th, 1884, on Municipal Organisation ;

Law of August 1st, 1905, on the Detection and Punishment of Fraud.

In addition, any handling of the oysters liable to render them unwholesome is prohibited, and, in particular :

(1) Watering or washing the oysters, for the purpose of cleaning the shells, with polluted seawater, such a harbour water or fresh water not fit for drinking, such as the water of rivers, canals or streams into which refuse or waste water flows, or drinking-water with the addition of salt (tainted kitchen salt, such as salt which has been used for the transport or preservation of fish or any other commodity) ;

(2) The cooling or preservation of oysters with ice unfit for consumption ;

(3) The storage of oysters in boxes, bags or baskets submerged along quays or in places liable to contamination ;

(4) The opening of oysters with dirty tools or appliances ;

(5) The washing of open oysters ;

(6) The preservation in dirty water of oysters removed from their shells.

Consequently, oysters treated by any of the methods described above must be seized and destroyed as dangerous to public health.

Mention must be made here of the essential provisions of this Decree, which provides for the supervision of the production, transport, sale or importation of flat oysters.

As regards production, “ only establishments owning oyster-beds recognised as healthy may despatch oysters for consumption or sell them direct ”.

The list of these establishments is drawn up by the Minister in charge of the Merchant Marine after an enquiry by the Scientific and Technical Office for Maritime Fisheries. This list may be modified at any time.

The Fisheries Office is responsible for carrying out periodical inspections for the purpose of ascertaining that the establishments on the list in question comply with health requirements.

Moreover, by *Decree-Law of October 30th, 1935*, adopted on the motion of the Minister for Public Health, relating to the protection of drinking-water and oyster-beds, the provisions of the Decree of July 31st, 1923, were extended to cover natural beds and shell-fish establishments.

It also makes the establishment of a protective zone around all these establishments compulsory.

The conditions of application of this Decree will be specified in the Public Administration Regulations now in course of preparation.

Regulations for the Detection and Punishment of Fraud.

The supervision of foodstuffs is based on the Law of August 1st, 1905.

Not only does this law provide for the punishment of any fraud regarding the nature, origin and quantity of the goods sold, but it also provides severe penalties for any adulteration of commodities used for the consumption of men or animals.

Penalties of imprisonment (varying from one month to one year) and a fine (from 100 to 5,000 francs) may also be imposed on any persons :

(a) Who display, offer for sale or sell foodstuffs which they know to be adulterated, tainted or poisonous ;

(b) Display, offer for sale or sell, with a knowledge of the purpose for which they are intended, products employed for the adulteration of commodities intended for human consumption.

Moreover, if the adulterated or tainted substance is harmful to the health of human beings or animals, the penalty will be imprisonment (three months to two years) and the fine imposed from 500 to 10,000 francs.

(c) Persons who are merely in possession of commodities intended for human or animal consumption " which they know to be adulterated, tainted, or poisonous ".

This law is thus of primary importance from the point of view of the protection of public health. The conditions under which it was to be applied to various foodstuffs were laid down in a series of later texts.

These dealt with :

- Fats and oils ;
- Various beverages (cider and perry, liquors and syrups, beer, hydromel) ;
- Vinegar ;
- Sugar, confectionery, chocolate ;

Pork-butcher's wares, fruit, vegetables, fish and preserves ;
Wines and spirits ;
Dairy produce ;
Butter and margarine, etc.

ORGANISATION OF SUPERVISION.

Supervision in respect of Fitness for Consumption.

The municipal authorities are responsible for satisfying themselves as to the fitness of foodstuffs for human consumption. Various administrative authorities are entrusted with the application of the regulations relating to this supervision. These are, as the case may be :

- (a) The Ministry of Public Health, in respect of all foodstuffs in general and drinking-water in particular ;
- (b) The Ministry of Agriculture (veterinary services) in respect of foodstuffs of animal origin—meat, milk ;
- (c) The Ministry of Merchant Marine (Maritime Fisheries Office) in respect of oysters and shell-fish.

Functions of the Ministry of Public Health.

In accordance with the legislation referred to above,¹ the municipal authorities are responsible for supervising, in respect of their fitness for consumption, foodstuffs offered for sale and drinking-water in particular. Provisions relating to this supervision must be included in the municipal health regulations promulgated in each commune by municipal decree, in application of Article 1 of the Law of February 15th, 1902. (These regulations have, however, been given a departmental character by Decree-Law of October 30th, 1935—that is to say, in future they will be promulgated by the prefect and will apply to all the communes in the department.)

Article 19 of the Law of February 15th, 1902, also provides that :

“ In towns of 20,000 or more inhabitants and in communes of not less than 2,000 inhabitants, where there is a hydropathic establishment, a municipal service responsible, under the authority of the mayor, for the application of the provisions of the present law shall be set up under the name of the Health Office.”

The mayors discharge their functions in regard to health under the supervision of the prefectural administration. In this connection, the same law provides (Article 19) that :

“ If the prefect, with a view to giving effect to the present law, considers that a supervisory and inspection service should be organised, this may only be done by decision of the general council regulating the details and budget of the service.”

¹ Law of April 5th, 1884 ; Law of February 15th, 1902.

The setting up of a service of this kind has just been made compulsory in each department by Decree-Law of October 30th, 1935.

The Ministry of Public Health (Department of Hygiene and Assistance) supervises the application of all health measures relating to the fitness of foodstuffs for human consumption under the health regulations (Fifth Bureau) or regulations for the prevention of epidemic diseases due to impure food (Sixth Bureau).

This administration appoints and arranges for the supervision of approved laboratories for the analysis of drinking-water.

In exercising these various functions, the Central Administration of Public Health consults the Supreme Council of Public Health, which is responsible, in particular :

For studying the health regulations ;

For giving advice as to the choice of approved laboratories for the analysis of drinking-water and for their supervision ;

For advising upon public sanitation works or works for the supply of water to towns of over 5,000 inhabitants ;

For studying any questions referred to it by the Minister.

We would mention that the Minister has the right to submit to the Academy of Medicine questions relating to foodstuffs in the same way as any questions affecting the protection of public health in general.

Result of the Supervision exercised under the Authority of the Minister for Public Health.

(a) *Supervision of Foodstuffs in general.* — This supervision is exercised more or less strictly according to the means at the disposal of the municipal administrations. While it is very thorough in towns of over 20,000 inhabitants which possess a special health organisation, it is necessarily more rudimentary in smaller towns and in small communes which are obliged to apply to the special departmental services (departmental health inspectorates).

The recent measures promulgated (substitution of departmental health regulations for municipal regulations, compulsory establishment in each department of an inspection and supervisory service) will give the prefectural administrations greater authority and more extensive means of action, and will enable the supervision of foodstuffs to be made closer.

(b) *Supervision of Drinking-water.* — The supervision exercised in France is very strict. Pollution by feed water is exceptional. On the other hand, pollution by water stated by the health authorities to be unfit for drinking is still too frequent. These accidents are attributable, not to inadequate supervision, but to the fact that a water-supply complying with all the conditions desirable from the point of view of

health is not available everywhere. It is for this reason that, notwithstanding budgetary difficulties, considerable efforts are being made to increase the supply of drinking-water.

Functions of the Ministry of Agriculture: Veterinary Services.

(a) *Organisation of Meat-inspection Services.* — The vast majority of municipalities introduced supervision in regard to the fitness for human consumption of meat prepared in their locality or brought into it (Law of April 5th, 1884), without waiting for the compulsory provisions of the Law of July 7th, 1933.

In the towns, permanent inspection is ensured by one or more veterinary officials attached to the service.

In Paris, in particular, a service consisting of fifty-two veterinary officials ensures the regular supervision of all establishments engaged in the meat industry or trade.

In smaller places, both public and private slaughter-houses are under the supervision of veterinary surgeons, assisted by local officials.

These services, which were organised under the Laws of April 5th 1884 (Article 97), June 21st, 1898 (Article 63), January 8th, 1905, and January 8th, 1921, are placed under the supervision of the Departmental Director of Veterinary Services, who "proposes to the prefect such measures as are necessary to ensure the application of the laws and regulations relating to the fitness for human consumption of foodstuffs of animal origin and the suppression of fraud" (Decree of May 3rd, 1923, Article 5).

All these services are under Government supervision.

"The directors of the veterinary services and veterinary officials, veterinary inspectors of fairs and markets, slaughter-houses and knackers' yards are placed under the authority of the inspectors-general of the veterinary services (Article 11 of the above-mentioned Decree), who are themselves under the Chief of the Veterinary Service at the Ministry of Agriculture."

The inspection services have been instrumental in obtaining the withdrawal from consumption of large quantities of meat, as shown by the figures in the reports regularly submitted by the chiefs of the departmental services.

For the Seine Department alone, the Slaughter-house Inspection Service effected, in 1934, 113,000 seizures, covering 2,230,000 kilogrammes of meat.

(b) *Supervision of Milk.* — This supervision devolves, according to their respective functions and powers, upon the officials of the service for the suppression of fraud, the public health and veterinary services, who are responsible for the application of the regulations referred to above.

In addition to these various forms of supervision, certain municipalities have taken steps to provide the population as a whole or a certain part of it with milk of good quality.

For instance, the city of Bordeaux, in conjunction with the Girondist Federation of Child Welfare Associations, has succeeded in producing pure raw milk for babies. The cost price of this milk is rather high, and the town is therefore obliged to sell it at a loss to families unable to pay the full price. This example deserves to be followed.

Nancy has also organised a system of supervision for the purpose of providing the public with clean milk, and this has been willingly accepted by producers and sellers.

Similarly, Versailles has introduced the supervision of milk in shops, and has supplemented this by inspection during transport.

Lyons and St. Etienne each have a model dairy, over which strict supervision is exercised, and which supplies institutions, municipal day nurseries and private child welfare organisations.

We would also mention that certain municipalities (Strasburg, for instance) run municipal dairies. Strict supervision is exercised to ensure that the milk distributed by those dairies is pure.

Lastly, it should be noted that the big milk companies carefully check the quantities of milk offered for sale, both before and after pasteurisation at their collecting centres. Special supervision of byres and of the conditions under which the milk is collected have also been instituted by them.

Inspection of Covered and Open Markets. — In all the large towns the municipalities have organised, in accordance with the Laws of April 5th, 1884, and February 15th, 1902, inspection services of covered and open markets. These services are responsible, in particular, for the supervision of certain foodstuffs (for instance, eggs and mushrooms).

Functions of the Ministry of Merchant Marine (Maritime Fisheries Office).

A special service of this office is responsible for supervising the wholesomeness of oysters and shellfish, in accordance with the provisions of the Decrees of July 31st, 1923, and October 30th, 1935, to which we have already referred.

For this purpose, regional inspection services, placed under the supervision of an inspector-general for the hygienic supervision of oysters and shellfish, have been organised all along the coast.

Eight areas have been established.

These services include inspectors, deputy inspectors, supervisors and laboratories.

Analyses are also made in Paris, at the Central Laboratory of the Fisheries Office.

Results. — This service has been strengthened year by year, and the creation of new posts of inspectors is now proposed. The results of

this supervision can already be regarded as satisfactory, at all events so far as oysters are concerned.

The provisions of the Decree-Law of October 30th, 1935, mentioned above, will enable strict supervision to be exercised over shellfish from the point of view of their wholesomeness.

Detection and Punishment of Fraud: Functions of the Ministry of Agriculture.

Service for the Detection and Punishment of Fraud in France.

The Service for the Detection and Punishment of Fraud was set up by Decree of April 24th, 1907, with a view to the application of the Law of August 1st, 1905, on the suppression of fraudulent practices in the sale of commodities, and particularly the adulteration of foodstuffs, beverages, agricultural produce and medicaments.

A corps of inspectors for the detection and punishment of fraud (attached to the Chief of the Service) was accordingly established by Decree of October 21st, 1907. This corps makes expert enquiries and serves as a link between the Central Administration and the prefectural services for the suppression of fraud.

Another Decree of January 17th, 1908, set up a Central Laboratory for the Detection and Punishment of Fraud at Paris, mainly for the purpose of carrying out scientific researches in connection with the detection of fraud, giving directions to local laboratories where the latter apply to it for advice, and, lastly, of analysing one portion of the samples taken in the Parisian area, the other portion being analysed by the Laboratory of the City of Paris, which has been approved for that purpose.

The number of approved laboratories and agents in connection with the service has since been increased.

The functions of the laboratories are local, inasmuch as they are responsible for the analysis of samples taken in the departments or "arrondissements" under their supervision; but there are certain special laboratories which handle samples from the whole of France. Samples of preserves, for example, wherever taken, are all sent to the Preserves Laboratory of the Ministry of War. Similarly, seed samples are all sent to Paris to the Seed-testing Institute, and samples of resinous products to the Laboratory for the Analysis of Resinous Products at Bordeaux.

Article 11 of the Law of August 1st, 1905, on the detection and punishment of fraudulent practices in the sale of commodities and foodstuffs and agricultural products provides that public administration regulations shall be promulgated regarding the measures to be taken to give effect to that law, particularly as regards :

- (1) The sale, offering for sale, displaying and possession of the foodstuffs, beverages, substances and products to which the law applies;

(2) Marks and inscriptions, indicating either the composition or the origin of the goods or regional appellations and special vintages, which buyers may require to be entered on the invoices, packings, or on the products themselves, as a guarantee on the part of the sellers, and also the outside or visible indications required to ensure that the description under which the goods are sold or offered for sale is correct ;

(3) The formalities for the taking of samples and the analysis of suspect goods by the approved laboratory and a laboratory selected by the seller ;

(4) The selection of the methods of analysis for the purpose of establishing the composition, constituents and content in valuable principles of the products, or detecting their adulteration ;

(5) The authorities competent to take steps to discover and establish infringements of the law, and their right to collect information from the various public administrations and transport agents.

The drawing-up of these draft public administration regulations has been entrusted to two commissions, one dealing with beverages and the other with foodstuffs.

Both commissions were appointed by agreement between the Minister of Agriculture and the Minister of Commerce and Industry, by Decrees of November 15th and December 12th, 1905.

With a view to the application of the fourth paragraph of Article 11, a Permanent Technical Commission responsible for determining the analytical methods to be employed and specifying both their method of application and the manner in which their results are to be interpreted, was set up by Decree of December 15th, 1905.

As the outcome of the work of these various commissions, which was itself based on the decisions and recommendations of the International Congresses for the Suppression of Fraud held at Geneva (September 1908) and Paris (October 1909), a large number of regulations have been adopted giving effect to the Law of August 1st, 1905, particularly as regards wine, sparkling wine, brandy, various beverages, sugar factories, confectionery, preserves, milk and milk products.

The Service for the Detection and Punishment of Fraud is therefore responsible, not only for supervising the observance of these regulations, but also for supervising the execution of the provisions of special laws relating to butter, fertilisers, spirituous liquors and poisonous substances. It must endeavour to detect fraudulent practices and the adulteration of these products and also of medicinal products and mineral waters.

Lastly, it must also supervise the application of the laws for the protection of appellations of origin, and, in particular, endeavour to detect fraud and falsification as regards the origin of the products.

The Service for the Detection and Punishment of Fraud is also entrusted with the supervision of prices, and must see to the public posting up of the prices of foodstuffs, and of grain and flour coming on the market.

Products offered for sale are inspected by means of the taking of samples and analyses.

Every year, some 40,000 samples of foodstuffs, beverages and agricultural products are taken in the whole of France. Suspect samples are reported to the judicial authorities, and the courts are then called upon to inflict on the guilty parties the penalties by law provided.

Since the establishment of the service, the situation has certainly improved considerably. The grosser forms of adulteration are becoming more and more rare ; but the progress of science has placed new weapons in the hands of the adulterators. Adulteration is now more scientific, and consequently more difficult to detect, particularly where the supervision cannot be exercised at the place of manufacture.

International co-operation is therefore highly desirable for the purpose of combating adulteration more effectively. Such international action would imply the conclusion of a convention embodying more definite directions in connection with the specification of the composition of certain foodstuffs, and the definition of licit and illicit trade practices, together with the steps to be taken in the event of the detection of adulteration.

ORGANISATION OF CERTAIN SPECIAL SYSTEMS OF SUPERVISION.

Dietetic Supervision in the Army (Home Troops).

Appropriate steps are taken for the inspection of each article of food as it arrives, both by the supply services and by the various units.

The general rules already mentioned are strictly applied in the army.

Finally, information is given concerning the steps taken to ensure that foodstuffs shall contain the proper proportion of so-called protective substances (minerals and vitamins). General instructions issued by the Ministry of War specify the proportion of these substances that the various articles of food should contain. The best average daily ration for the various units, living under ordinary conditions, is thus established.

Dietetic Supervision in the Army (Colonial Troops).

The general principles observed for inspection in the home army are also applied in the colonial army. Certain special points concern the diet of soldiers serving in the colonies.

Dietetic Supervision in the Navy.

A detailed memorandum on this subject is preceded by certain information on the sailors's diet :

- (a) On shore service or in surface vessels ;
- (b) In submarines.

It sets out the methods of inspecting the various foodstuffs destined for the various branches and draws attention to the severity and efficacy of this inspection.

Dietetic Supervision in Hospitals and Hostels.

Article 7 of the Organic Law of August 7th, 1851, leaves it to the Administrative Commission "to direct and supervise the internal and external services of hospitals and similar establishments".

Article 8 (4) specifies that the Commission "shall, subject to the approval of the Prefect, establish the rules governing both internal and external services and health . . ."

One of the main aims of the internal rules is to regulate diet and food supplies.

The model set of rules adopted by the Conseil Supérieur de l'Assistance Publique and communicated to prefects in a circular, dated March 31st, 1926, gives very precise indications on this subject.

The steward and the doctor in charge of the case are responsible respectively for food supplies and the patient's diet.

Under Article 10 of the model rules, the steward's duties are :

- (1) To purchase, store and preserve *foodstuffs* and furniture of every kind ;
- (2) To distribute these foodstuffs and articles. He shall carry out these duties under the supervision of the Managing Board.

Furthermore, under Article 12, doctors and surgeons must record, in a special register, their prescriptions and the diet ordered for each patient. After each visit, they must sign this register.

Chapter 10 of the rules is devoted to dietary questions.

Questions of diet are decided, in the hospital or hostel by the Managing Board, "in agreement with the medical staff of the establishment". No change may be made until the medical staff has been consulted, the opinion of such staff being expressly annexed to the "Board's decision transmitted to the Prefect for approval".¹

The Ministerial Circular makes the following comments on this article, which indicate certain aspects of the patient's diet to which attention should be paid :

"The circular of June 26th, 1924, drew your attention to the desirability of increasing the consumption of fish in public institutions.

"The report of the Inspector-General for the year 1925 refers to the economy effected by one national assistance establishment as a result

¹ This decision must include a description, in the form of a table, of the dietary regime which the hospital administration has prepared, in the light of its own experience, within the framework of the theoretical table attached to the model rules.

of adopting frozen meat. The same document contains observations applicable to all hospitals, concerning benefits in kind accorded to the staff, particularly in the matter of foodstuffs."

A plan of meals and diets is also given in the model rules. Article 52 is of special interest. It is worded as follows :

" Every day the steward shall, in agreement with the supervisor of the kitchen, draw up the menu of the various meals for the following day. This menu must be submitted previously to the medical officer of the institute ; it shall then be posted up in the kitchen and a copy shall be kept in the stewards' office."

Dietetic Supervision in Sanatoria.

Article 21 of the Decree of August 10th, 1920, concerning the creation, working and supervision of sanatoria, lays down that :

" In public sanatoria, special regulations drawn up by the Supervisory Committee on the proposal of the chief medical officer in charge, after submission for approval to the representative of the body which maintains the establishment, shall provide for the organisation and working of the internal services . . . These rules shall make provision for all questions concerning . . . food supplies and diet. A general model set of rules shall be prepared by the Ministry of Health Assistance and Social Welfare to serve as a guide to the various bodies in the preparation of their own rules."

In public sanatoria, the chief medical officer in charge shall exercise dietetic supervision. Article 16 of the Decree lays down that :

" The chief medical officer in charge shall be generally responsible for the conduct of the establishment. He shall be in charge of the internal administration."

Article 17 states, however, that a steward-controller shall be responsible for accountancy in the matter of foodstuffs and supplies.

In this connection, it may be noted (Article 18) that :

" Laws and regulations concerning the general administration of hostels and charitable institutions, particularly as regards . . . the supervisory and managerial duties of the steward-controller . . . shall be applicable to public sanatoria, save in so far as they may be contrary to the foregoing provisions."

Preventoria are not yet subject to the rules governing sanatoria. The Decree-Law of October 30th, 1935, however, concerning the reorganisation of departmental health services, lays down that all the establishments concerned in the protection of public health shall be placed under the supervision of the departmental health inspector.

In this way, definite rules will be established for the management of these institutions. Special rules may be laid down to govern the diet of the inmates.

Holiday camps are also placed under the supervision of the departmental health inspectors.

Furthermore a model set of rules, which must be observed by all establishments in receipt of subsidies, has been prepared by the Ministry of Public Health.

There also exists a dietetic supervision in homes and charitable institutions, in elementary education establishments and in secondary education establishments.

STRENGTHENING THE SUPERVISORY ORGANISATION.

(a) *General Supervision.*

As has been already stated, though a very close watch is kept on all foodstuffs throughout France, effective supervision is much more difficult in the case of imported foodstuffs. Hence the need for international rules.

(b) *Special Forms of Supervision.*

It has been shown that an extensive supervisory network exists in France. The supervision of foodstuffs of the most varied character has been taken in hand. There are, however, certain foodstuffs which call for special treatment, such as irradiated foodstuffs, which have become very popular of late.

Special rules, the principles of which are explained in a separate note, will have to be prepared to meet this case.

On the other hand, the fitness for human consumption of certain products like milk can be better ensured by preventive measures than by subsequent supervision. It is reasonable to suppose that the quality of milk will improve in proportion to the knowledge of hygiene acquired by producers. This, then, is a case for the educational propaganda undertaken by the Ministry of Health.

Italy.

Supervision of everything connected with human food in Italy is by law under the Ministry of the Interior, which exercises its powers through central and local authorities.

The central authorities are the Directorate-General of Public Health and the Public Health Institute. Both are directly under the Minister of the Interior. The Directorate initiates the measures considered necessary, and is responsible for the execution of such measures through the provincial and communal public health authorities. The Institute,

which is a purely technical organisation, is a centre for study and research, and also for the checking of disputed analyses of the provincial Laboratories of Public Health and Prophylaxy.

The local organisation is similar to the central organisation. In each province there is a provincial medical officer and a provincial veterinary officer, both of whom are directly under the Prefect; and in each commune there is a public health officer, assisted where necessary by other officials, medical and veterinary officers, and chemists, all of whom are directly under the Podesta (Mayor).

In divisions of communes which the public health officer cannot cover, his powers are exercised by the local medical officer under the instructions of the Podesta.

Each province has also a Provincial Laboratory of Public Health and Prophylaxy organised on the lines of the Public Health Institute—*i.e.*, on a purely technical basis. These laboratories serve as research centres, and also undertake analyses as required by the provincial and communal public health authorities.

The supervision of the hygienic quality of foodstuffs thus operates from the centre through the provincial public health authorities down to the most remote and distant communes and villages.

PUBLIC HEALTH OFFICERS.

The public health officers constitute the basis of the organisation for health supervision, and their powers in regard to the hygiene of foodstuffs are extensive.

Directly or through the staff under them, they supervise the production and sale of foodstuffs. They keep a watch on the health of the staff employed in the manufacture and sale of foodstuffs by periodical visits of inspection. They propose to the Podesta the measures required for the production of hygienic food conditions, and it is their duty to inform the provincial medical officer of health of any circumstances of a serious character.

PROVINCIAL LABORATORIES OF PUBLIC HEALTH.

The public health officers are assisted in their work by the Provincial Laboratories of Public Health and Prophylaxy. The latter are organised on wholly up-to-date lines, and represent one of the most important achievements of the Fascist regime in the matter of public health and the hygiene of food in particular.

These laboratories have bacteriological and chemical departments through which they are in a position to check the hygienic condition of foodstuffs on strictly scientific lines, and to bring to light any adulteration made possible by the development of technical science.

PUBLIC HEALTH LEGISLATION ON FOODSTUFFS.

In addition to the reform of the staff and institutions connected with the supervision of food hygiene, far-reaching improvements have been made in the legislation on this subject.

Until 1922, almost the only legislative enactments with regard to food hygiene were contained in the old Public Health Code No. 636, of August 1st, 1907, and in the Special Regulations for the Supervision of the Hygiene of Foodstuffs, Beverages and Objects of Domestic Use, No. 7045, of August 3rd, 1890.

Since 1922, the private initiative of producers and traders has been regulated in the public interest.

In addition to the hygienic control of slaughter-houses, the operation of the greater part of the food-producing industries has been made conditional on the obtaining of previous authorisation from the public health authorities. The latter are not allowed to give such authorisations unless they have first ascertained that the hygienic conditions of the premises, machinery and staff employed in the industry concerned are perfectly satisfactory.

The hygienic control of milk has been extended and improved by the institution in the principal centres of "Centrali del Latte" under the public authorities, for the centralisation and distribution of milk.

The hygienic control of shops has also been tightened up by the institution of an expert personnel of sanitary inspectors, food inspectors, etc., and special conditions have been laid down for the keeping of shops. Tradespeople are compelled, for example, to keep foodstuffs in suitable receptacles and not to expose them to contact with flies (Law No. 858 of March 29th, 1928, and Decree of the Head of the Government of May 20th, 1928), and so on.

QUALITY OF COMMODITIES FOR SALE.

In a number of cases the quality of products for sale has been defined—*e.g.*, the condition of flour, the maximum of humidity in the making of bread and alimentary pastes, the minimum grading of alcohol in wine, the minimum percentage of dry residue in syrups and syrup beverages, and the minimum percentage of fat and of thin residue in milk for direct consumption. The milk supply and the production of meat and the meat trade have been organised and regulated. Regulations on food extracts are about to be issued.

The main principles of the new regulations with regard to foodstuffs are the subordination to the public interest of private interests of industrialists and traders, the activities of the latter being regulated by authority, the extension of the powers of public health authorities, and the establishment of organisations and institutions for the

attainment of the objects which the Government has set itself in the matter of food hygiene. ¹

Mexico.

The General Office of Nutritional Hygiene puts into force special regulations relating to foodstuffs. Through its section dealing with regulations, it revises and improves existing measures as far as possible, so as to ensure the effective supervision and control of all foodstuffs. The section will study existing regulations, draw up new ones where necessary and see that they are effectively applied in the various parts of the country, by adapting them to the real requirements of public health, in accordance with the general efforts to improve living conditions, especially among the rural and working classes. This section will also reply to enquiries and give its opinion on all questions relating to nutritional hygiene, with the technical co-operation of all the other services or offices of the department.

The Food Registration Section will be responsible for the registration of foodstuffs, beverages, etc., sold in containers or special packings, whether coming from abroad or manufactured or prepared in Mexico, and also for analysing those products with a view to authorising their consumption.

The Veterinary Hygiene Section will study all questions relating to veterinary hygiene in its bearing on human health and of general interest to the country, particularly questions relating to imports.

¹ See in particular, the following legislative enactments :

1. The Public Health Code (Royal Decree No. 1265, of July 27th, 1934, published as a Supplement in Ordinary to *Official Gazette* No. 186, of August 9th, 1934-XII).
2. Regulations for the Hygienic Supervision of Meat (in *Official Bulletin*, No. 7-8, of March 11th, 1929-VII).
3. Regulations for the Hygienic Supervision of Milk for Direct Consumption (Royal Decree No. 994, of May 9th, 1929).
4. Regulation of Varieties of Flour and Bread (Law No. 368, of March 17th, 1932).
5. Regulation of the Sale of Alimentary Pastes (Law No. 874, of June 22nd, 1933).
6. Wines, vermouths and apéritifs : Legislative Decree No. 2033, of October 15th, 1925 (Articles 12, 13 and 15) ; Legislative Decree No. 1225, of September 2nd, 1932 (Article 11) ; Regulation No. 1361, of July 1st, 1926 (Article 61) ; Legislative Decree No. 1696, of November 9th, 1933 ; Legislative Decree No. 745, of April 8th, 1935 ; Regulation No. 2164, of October 4th, 1935.
7. Vinegars : Legislative Decree No. 1225, of September 2nd, 1932 (Article 18).
8. Oils : Legislative Decree No. 2033, of October 15th, 1929 (Articles 20 ff.) ; Legislative Decree No. 1314, of October 5th, 1933 (Articles 2 ff.) ; Regulations No. 1361, of July 1st, 1926 (Article 73).
9. Butter : Legislative Decree No. 2033, of October 15th, 1925 (Article 26) ; Legislative Decree No. 381, of April 6th, 1933 (Article 2).
10. Lard : Legislative Decree No. 2033, of October 15th, 1932 (Article 31).
11. Margarine : Legislative Decree of February 15th, 1934 (Article 290).
12. Cheese : Legislative Decree No. 2033, of October 15th, 1932 (Article 32) ; Legislative Decree No. 1752, of November 30th, 1933.
13. Fruit juices, syrups and preserves : Legislative Decree No. 1225, of September 2nd, 1932 (Article 14).
14. Food preserves prepared with vegetable substances : Legislative Decree No. 501, of February 8th, 1923.
15. Concentrated Tomato Sauce Extract : Legislative Decree No. 1260, of August 25th, 1932.
16. Preserved Fish : Legislative Decree No. 1548, of July 7th, 1927.

As regards local activities, the service will be responsible, as in the past, for supervising the production, handling, transport, sale and distribution of foodstuffs, beverages, etc., within the Federal District. For this purpose, the various questions will be divided up as follows :

(1) Questions coming within the province of the Veterinary Hygiene Section :

Sanitary inspection of slaughter-houses, including the inspection of the meat and viscera of animals of various kinds authorised to be killed for public consumption in the slaughter-houses and factories manufacturing meat products in the Federal Districts ;

Sanitary inspection of shops ; supervision of butchers' shops and shops for the sale of poultry, game, fish, shell-fish, etc. ;

Sanitary inspection of poultry offered for sale in the market ;

Sanitary inspection of byres ;

Tuberculin-testing service, which comprises the sanitary control of animals to be used for the production of guaranteed milk, by means of the tuberculin-test and the careful examination of the animals themselves, with a view to eliminating tubercular animals ;

(2) Questions relating to milk and milk products—namely, the inspection of pasteurising plant and the sale and distribution of local milk and milk products, and of milk and milk products coming from other districts ;

(3) Questions relating to " pulque " ; sanitary inspection ; the transportation and sale of " pulque " ;

(4) Sanitary inspection of any foodstuffs or beverage not referred to in the foregoing paragraphs, including its production, handling and sale.

There will also be offices to attend to the formalities connected with the licensing of establishments producing and selling foodstuffs and beverages and with infringements of the regulations, and also with licences to bring in, transport and distribute those articles.

Poland.

The Ministry of Social Assistance, which deals with all public health questions, including that of rational feeding, has a Food Control Board attached to it, which also conducts enquiries into popular nutrition and researches into nutrition from the health standpoint.

Roumania.

(a) In Roumania, the law for the protection of health lays down that all foods and food ingredients supplied for consumption must be of good quality, and not adulterated nor tainted. Special reference is made to milk. The controlling authorities are the sanitary inspectors-

general, the chief medical officers in the departments, the chief medical officers in municipalities, the medical officers in rural and urban districts and the laboratory chemists and doctors.

The control of meat in slaughter-houses and of animals destined for human consumption is carried out by veterinary officers.

(b) There is a law providing for veterinary supervision, and for the control and sanitary regulation of slaughter-houses, as well as of stabling and of animals intended for use as human food.

(c) Regulations are laid down for the control of articles of food and drink—in particular, specifying the conditions to be fulfilled in the case of milk, powdered milk, etc.

(d) There are legal regulations for veterinary sanitary control.

Switzerland.

The campaign against poor quality foodstuffs and for the protection of public health is the subject of a whole series of regulations extending to meat, meat preparations and other foodstuffs, as well as to a number of articles in common use, into the manufacture of which substances liable to have an injurious effect on the human body have occasionally entered.

In conformity with Swiss political conditions, the supervision is divided between the Confederation and the cantons. Generally speaking, the Federal authorities supervise imports, while the cantonal authorities supervise internal production, though on similar lines.

Meat and meat preparations must satisfy the requirements of the Veterinary Department, as laid down more particularly in :

(a) The Ordinance concerning the slaughter of livestock, inspection of meat and trade in meat and meat preparations of January 29th, 1909 ;

(b) The Ordinance regulating the supervision at the frontier of meat and meat preparations imported into Switzerland of January 29th, 1909.

Foodstuffs and common objects subject to supervision are inspected with a view to their quality and compliance with the legal rules contained in such regulations as :

(c) The Ordinance concerning cantonal inspectors of foodstuffs of January 29th, 1909 ;

(d) The Ordinance concerning chemists for the analysis of foodstuffs of September 27th, 1919 ;

(e) The Ordinance regulating trade in foodstuffs and diverse common objects of May 26th, 1936 ;

(f) The Regulations for the taking of samples of foodstuffs and common objects of April 16th, 1929;

(g) The Ordinance regulating the supervision at the frontier of foodstuffs and common objects of October 28th, 1932.

Turkey.

Very considerable efforts are being made to regulate the consumption of food products on sound and hygienic lines. The Turkish Penal Code, published in 1926, contains, for the first time in Turkey, provisions with regard to the purity of foodstuffs. The Public Health Law which came into force in 1930 has again been concerned with this important problem, which it has endeavoured to solve on entirely up-to-date lines. Successive executive measures and instructions have served to fill up gaps in the legislation on the subject. Special attention has been devoted by the authorities to the milk question.

Uruguay.

Since its "Organic Law" was issued on January 12th, 1934, the Ministry of Public Health has given serious attention to the problem of national nutrition. Chapter IV: "Police Supervision of Foodstuffs", includes among the functions of the said Ministry the "determination of the conditions to be complied with by the foodstuffs put on the market and regulations concerning their quality and purity". It is laid down that this supervision is to be carried out by "officials of the Ministry, without prejudice to any action taken by the municipal authorities and the Customs offices concerned."

In Uruguay, milk forms the subject of a special Act and of municipal regulations governing supply and distribution; and pure milk is now available for consumption in the capital and in certain places inland, as the result of pasteurisation and strict supervision.

In this connection, a study is now being made on the basis of publication No. 5 of the Pan-American Health Office—*i.e.*, Model Decree concerning Milk—of national regulations to serve as a basis for the communal and departmental authorities in the application of measures for the improvement of milk for consumption. The regulations on the subject will thus be standardised.

Yugoslavia.

In Yugoslavia, to protect the public health and insure wholesome food for the population, the Law on the Supervision of Foodstuffs of February 8th, 1930, brings under public control foodstuffs and beverages of all kinds, including the appearance, taste and colour of spices, and the instruments used, or to be used, for manufacture, weighing, packing, preserving or consignment.

The object of the supervision is to :

- (1) Insure that the quality of fresh or treated foodstuffs is wholesome ;
- (2) Prevent contagious or parasitic diseases from being transmitted through the medium of foodstuffs ;
- (3) Prevent poisoning or other effects injurious to health as a result of the use of foodstuffs or of the instruments, tools or receptacles required for their manufacture, packing, preserving or consignment ;
- (4) Prevent counterfeiting and adulteration of foodstuffs in a manner injurious to health ;
- (5) Prevent injury to the nutritive value of foodstuffs or beverages of any kind.

CHAPTER VII.

RESEARCH, EDUCATION AND PUBLIC INSTRUCTION.

Side by side with the relief organisations' activities, an intense propaganda has been conducted to study this problem and to draw the attention of the public and of scientists to the importance of the question of nutrition and also to promote effective application of the measures suggested by experts. Patience is an essential factor in modifying the tastes and habits of a people. With modern technique, however, amazing results can be achieved by popular education and propaganda.

Union of South Africa.

In South Africa, the Health Department of the Central Government employs a medical inspector and a number of nurse-lecturers in its child welfare section. These officers continually travel about the country instructing groups of mothers and others in infant health and more particularly infant feeding.

The South African Red Cross Society and the South African National Council for Child Welfare do much health educative work, including instruction on nutrition throughout the Union. The latter organisation employs full-time trained women health visitors for this work.

Various missionary societies have hospitals and clinics in backward native areas and are doing valuable educative work.

Propaganda work with regard to disseminating among the public a knowledge of the principles and practice of rational nutrition is continuously being done by the officers of the Central Government, local authorities and charitable organisations enumerated above. This work is being done by such officers along with numerous other health duties, and it cannot be claimed that instruction regarding nutrition is spreading at all rapidly, particularly among the "poor whites" and Bantus, where it is most needed.

Argentine Republic.

THE MUNICIPAL INSTITUTE OF NUTRITION IN BUENOS AIRES.

The Municipal Institute of Nutrition in Buenos Aires is the only institution in the country for the study of the social and technical problems bearing on popular nutrition. It is subsidised by the Central Government with the help of credits provided for under Law No. 11912.

The Institute consists of the following branches :

- (1) A hospital consisting of (a) wards for men, women, children and infants, 100 beds in all ; (b) outpatients' departments for men, women, children and infants ; (c) nutrition services with canteens ; (d) canteens for outpatients ; (e) clinical analysis laboratories ;
- (2) A Municipal School of Dietetics, comprising two years' study at the university ;
- (3) The Chair of Clinical Medicine at the Faculty of Medicine of Buenos Aires, occupied by Professor Escudero ;
- (4) Food research laboratories ;
- (5) A section for supervising and protecting healthy individuals, to which we shall refer later.

In September 1935, the Institute set up a section known as the "Section for assisting and protecting Healthy Persons", the cost of which is met out of the credits provided for under Law No. 11912. This section consists of eight sub-sections, for the services of which no charge whatever is made.

The first sub-section supervises the health, nutrition and work of pregnant women who apply to it (obstetrical treatment is excluded) ; when the family's means are insufficient to ensure proper nutrition, food is provided at the Institute's canteen.

The second sub-section supervises the health, nutrition and work of nursing mothers and, where necessary, supplies them with food.

The third sub-section supervises the normal growth and healthy development of children on the register and gives advice as to their food, rest and mental and physical work.

The fourth sub-section supervises the health of persons of both sexes and gives them advice on the subject of physical labour in relation to bodily health.

The fifth sub-section advises upon diet with due regard for the age, work, physical condition and economic situation of the persons concerned. It draws up a family dietary based on the income, work, age and sex of the members of the family.

The sixth sub-section gives confidential information to persons intending to marry and tells them whether they are suffering from communicable diseases. It tells married people suffering from parasitic affections which can be passed on to children how to prevent inherited disease and counteract the effects of such heredity.

The seventh sub-section supervises the nutrition of healthy children from birth until they reach the age of four and ascertains whether their mental and physical development is normal.

The eighth sub-section will be inaugurated shortly.

This last-named sub-section will be supplemented, in July 1936, by the setting-up of an establishment for supplying infants who need it with human milk in sterilised bottles containing 10 c.cm. This milk will be supplied free of charge to children whose parents are not in receipt of more than the minimum wage. The milk will be bought from mothers who are feeding their child at the breast, under the Institute's supervision; only the surplus which can be taken without depriving the child will be purchased; it will be taken and preserved according to aseptic methods.

The grants made for the purchase of milk are quite small; they are never large enough to cover the family's expenses, which must be met by regular work.

SCHEME FOR ESTABLISHING PUBLIC CANTEENS.

In his articles published in the *Prensa*, of Buenos Aires, in 1931, and reproduced in his book on nutrition, Professor Escudero set forth the reasons—technical, economic and social—why public nutrition services should be set up under the municipalities for the purpose of providing the population with meals at the cost price of the raw materials or of the preparation of those meals. The general establishment of such services would solve an important economic and social problem in connection with the feeding of the poorest section of the urban population. It would save them the necessity of preparing meals for themselves and would enable them to obtain them at much less than their present cost. Housewives would be able to devote to other productive occupations the time spent in preparing meals, and malnutrition, with its serious consequences, would be avoided.

The Institute has decided to set up these public canteens so far as its resources permit, for demonstration purposes and with a view to encouraging the establishment of similar canteens in every district.

The system of public canteens and the establishment of a sufficient number of canteens for patients who are resuming work would solve the most serious problem raised in connection with the nutrition of the workers.

Canteen for Patients who are resuming Work.

When a patient leaves the hospital in order to take up a normal life again, his diet requires special care. He does not lose touch with the hospital, and attends the canteen. In 1922, Professor Escudero set up a canteen for patients whose case-record cards show that they need a special diet. These patients come to the canteen at meal-times, and resume their work, which enables them to provide for the livelihood of their families.

The Argentine is probably the first country to have established this form of social assistance to sick persons on their return to normal life. The general adoption of this system throughout the municipality was proposed in 1934.

Canteens attached to Municipal Schools.

In application of Decree No. 7279, the Municipal Institute of Nutrition has set up a school nutrition service for the sole purpose of looking after children who attend the canteens. This nutrition service is under the authority and technical supervision of the Director of the Institute. It also possesses a staff of pediatricians who are responsible for selecting the children. Under-nourished children and those who are suffering from disorders due to inadequate or defective nutrition are singled out. These children are provided each day with lunch having a net caloric value of 1,250 calories. During the winter months, three canteens, each with accommodation for 500 children, will be established and others will be set up later until there is accommodation for 4,500 children. These children will also be placed under the supervision of the Government and the Physical Education Department, which will supplement the measures taken by the Institute.

RESEARCH.

A New Use for Hard Wheat.

The Work of the Municipal Institute of Nutrition is not confined to propaganda; it is also endeavouring to solve the technical problem of the economical nutrition of the population. It has been laid down as a principle that the concept of popular nutrition should be based, not on the actual diet of the people, but on diets making full use of local products.

In this connection, the Institute has considered by what means hard corn, the most perfect type of which is wheat, can be utilised direct as a substitute for dried vegetables, which are imported and which, if home-grown, work out at a higher price. The problem has been dealt with from the economic, technical and industrial standpoints. For some time past, corn prepared according to the formula specified by the Institute has been on the market. The six outer cellulose layers are removed by a special process, leaving the grain and protein layer, which constitute the nutritive value of the corn, intact.

A pamphlet on wheat, containing recipes for the preparation of various dishes for which wheat is used, has been published. This utilisation of hard wheat has the advantage of creating a new demand, without reducing the sale of bread cereals, which cannot be used in this form. Hard wheat is used solely for the manufacture of alimentary pastes.

POPULAR INSTRUCTION.

A campaign to disseminate the principles of rational nutrition was begun some time ago. Last year, a series of popular lectures on the following subjects was inaugurated :

(1) A rational hospital dietary : determination of the rational form of nutrition in hospitals, in accordance with the general nutritional principles laid down by Professor Escudero ;

(2) The risks to which consumers of the milk sold at Buenos Aires are exposed : essential precautions ; hygienic requirements ; advice as to how these risks may be avoided ;

(3) The importance of milk as an article of diet : why it is so valuable and why it should be consumed in large quantities ;

(4) The value of meat for the prevention and treatment of anæmia due to defective nutrition, and of the iron contained in meat ;

(5) The nutrition of pregnant women : characteristics of this condition ; advice as to the most suitable and economical diet ;

(6) Why animal albumen should be consumed daily : demonstration of the medical advantages ;

(7) Cheap dietaries for workers : analysis of the dietaries of sixty families and of their means : how their diet can be improved within the limits of those means ;

(8) Influence of vitamins A and D on the growth of the child.

Australia.

(For living-wage standards, see Chapter III, page 99.)

The State of New South Wales.

TESTING THE PREVAILING LEVEL OF NUTRITION.

The general average nutrition of the inhabitants is tested by periodical examination of the protein content and calorific value of the calculated *per capita* consumption of the principal foodstuffs. The last public examination was made by the Industrial Commission in 1932, by methods similar to those used in "The National Diet", and with satisfactory conclusions. The nutrition allowance was compared with

the average diet of the Ford Motor Company's employees in Detroit, as analysed by the International Labour Office, the results being published under the title "International Enquiry into Costs of Living", Geneva, 1931. The Commission at the same time examined the vexed question of the relative requirements of men, women and children of different ages. It found, incidentally, that, in comparison with the newer standards of calorie requirements laid down by recent authoritative works, the Atwater coefficients used by the Commission in conjunction with a standard allowance of 3,500 calories a day for an average man gave adequate total nutrition for its statutory family of man, wife and one child (as prescribed by the Legislature in 1929 in conjunction with child endowment).

EDUCATION.

In the schools of New South Wales, from the kindergarten up to the senior grades of the primary schools, children are taught the value of proper food and healthful diet. In the domestic science schools, special attention is devoted to the study of home economics (including food and diet), which is included as one of the subjects in the Intermediate Certificate Examination. Lectures on food and nutrition are also included as a part of the course in hygiene which is taken by all students passing through the Teachers' College.

The Department of Health of the State of New South Wales issues, gratis, from time to time, pamphlets on nutrition in non-technical language. An example which has a wide circulation is issued under the title "Food and Nutrition".

The State of Victoria.

EDUCATION.

Much work has been done by both public authorities and private organisations in this State by :

- (1) Lectures to expectant mothers on diet given by doctors and nurses at baby health centres. Talks are also given to mothers on the diet of infants and young children.
- (2) In State schools, health instruction, including dietetics, is given as a part of the ordinary school curriculum.
- (3) Classes for older girls in food values and the preparation and cooking of food have been established at all schools of domestic economy.
- (4) The Better Farming Train, which reaches all portions of the State, includes a trained lecturer on infant welfare and an instructress in cooking, who lectures to country women on diet and the preparation of food.

(5) Wireless talks to schoolchildren are given by a medical expert in all health matters, including dietetics.

(6) General broadcast talks are given to the public on dietetics by medical experts.

(7) Pamphlets and articles in the daily Press are issued on dietetics by health departments and by such associations as the Health Association of Australia.

The State of Western Australia.

Educative pamphlets upon food requirements and diet have been issued in large numbers by the Health Department of Western Australia, and in regard to infants and young children also by the Infant Health Association. Lectures and broadcasts also assist in this direction.

The Northern Territory.

The Administration maintains a medical service throughout the territory, which concerns itself, *inter alia*, with the health and welfare of the population, and reports on any action necessary to correct defects from time to time detected.

The organisation of the medical service provides the only means in the territory of testing the prevailing level of nutrition, and investigations have been carried out in respect of certain groups of aboriginals, persons in institutions, schoolchildren and persons in receipt of Government relief. It so happens that the general dietary of the white population in the territory is for the most part adequate. Deficiencies in the supply of milk and vegetables are at the present time the subject of investigation. It is anticipated that a report will be made to the Administrator in the immediate future. Pre-natal and infant welfare clinics are maintained in Darwin for the guidance of mothers of all races.

Information is collected in two ways :

(1) Study of the individual from the pre-natal period until death, this procedure being rendered possible by the organisation and practice of the Medical Service.

(2) Direct enquiry into the dietary of different races and groups of people collated from details furnished by individuals.

Territory of Papua.

The Papuan Native Labour Regulations empower the Commissioner for Native Affairs to order an employer to provide special diets for indentured native labourers showing signs of deficiency diseases, such as beriberi, scurvy, tuberculosis or pneumonia ; detailed supplementary diets are prescribed in such cases.

For the medical and health service, the Government maintains three fully qualified Government medical officers, six European medical assistants, forty-three travelling native medical assistants and, at the European and native hospitals, thirty native attendants. A European medical assistant is employed both at Port Moresby and at Samarai. The forty-three travelling native medical assistants have, for the most part, received a six months' training under the chief medical officer, followed by a six months' course of study at the School of Public Health and Tropical Medicine in Sydney, Australia. The work of these native assistants is highly appreciated by the district officers and public. They work under and report directly to the chief medical officer and are visited by the travelling European medical assistants.

The Government medical officers, the Government medical assistants and the native medical assistants do their best to disseminate the principles and practice of rational nutrition along the lines of the knowledge of vitamins. But it must be admitted that the great difficulty is that of supplying the correct foods. The missions do valuable work in instilling into the natives the more correct methods of the feeding of infants and of the pregnant and nursing mothers. But modern methods are pretty well impossible as a rule, due to the lack of financial resources and the consequent difficulty in getting adequate foods in accordance with relatively expensive European standards.

Mandated Territory of New Guinea.

NUTRITION OF INDENTURED NATIVES.

With the exception of labourers in the goldfields area, where the indentured natives are living at altitudes of from 3,000 to 7,000 feet above sea-level, and where the mortality from pneumonia, influenza and dysentery is very high, the improvement in stamina and physique of natives during their terms of contract where they have regular working hours, balanced diet, and prompt medical treatment of active or latent tropical diseases is most obvious, and a very strong justification for the system of indentured labour.

The diet is, on the whole, adequate. The absence of beriberi—except very few cases in prison camps, etc.—shows sufficiency of vitamin B. Fats, especially in other than coastal districts, are deficient, causing need for much bulky carbohydrates. The planting of extra coconut groves in inland areas is being encouraged.

The influence of the indentured labourers, returning after three-year contracts to villages in the interior, in educating the population in the growing of a more varied diet is becoming more and more noticeable.

The Agricultural Department gives instruction in the rotation of crops, and both this department and the missions distribute various seeds, thus gradually adding to the variety of the diet and increasing its vitamin value.

Austria.

EDUCATION.

In Austria, as regards the education of the people in the principles of rational nutrition, the Public Health Department of the Federal Ministry of Social Administration possesses a collection of lantern-slides, which are lent on request to those interested. These collections are frequently borrowed by doctors in all parts of the country for public or school lectures.

The Austrian Red Cross Society has an extensive range of exhibits, including fine pictorial representations of the various food products and their calorie content, and the composition of rational dietaries. This material is shown at travelling exhibitions. The last exhibition was held at Salzburg in October 1935.

Explanations of the principles and practice of rational nutrition are given, more particularly at elementary and secondary schools and in special courses organised by various economic organisations, such as Chambers of Agriculture.

Belgium.

EDUCATION.

In Belgium, the Ministry of Agriculture has taken various steps to ensure an improved dietary for the rural population, to which reference may be made. In field schools of agricultural domestic economy, young girls receive practical and theoretical training on the choice and preparation of food and on the facts of the science of human nutrition. Short courses are also organised for farmers' wives and older girls.

There is a service of domestic economy advisers in agricultural districts. These advisers have the diploma of agricultural domestic economy teachers. Their main object is to give the farmers' wives and housewives in rural districts such information as they may require with regard to the rational and economic feeding of their families, and also in regard to the upkeep and purchase of clothing and furniture.

The service of domestic economy advisers also makes it its business to discover the districts in which there is an opening for courses or lectures on domestic economy. The advisers organise propaganda, attend lessons, etc.

A higher-training college has been established for the study of agricultural domestic economy, and subsidies are granted to six similar institutions of a private character. The object is to prepare a body of picked women capable of improving social conditions among the rural population, and to train teachers of agricultural domestic economy, who acquire the title of qualified agricultural domestic economy teachers. The period of study is three years. Teaching is both practical

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and theoretical. The different branches of the science of nutrition predominate in the programme of study and are thoroughly taught. Young girls also learn the special methods of giving lessons in cookery.

Subsidies are also granted to some forty middle schools of agricultural domestic economy, at which the pupils are children of 12, 13 and 14 years of age.

In addition, a large number of popular courses in agricultural domestic economy are organised with the help of subsidies, as well as lectures and demonstration lessons relating to nutrition among groups of farmers' wives and agricultural housewives.

POPULAR INSTRUCTION.

In Belgium, there has been an intensive propaganda to promote the consumption of milk. The propaganda takes the form chiefly of posters, articles in newspapers and "Milk Days" or "Milk Weeks". Private organisations have also done much to improve conditions of nutrition in the countryside. Groups of farmers' wives often arrange for lectures and demonstration lessons in cookery for their members.

Fish days consist in demonstrating the manner of gutting, cleaning and preparing cheap fish, and explanations of the nutritive value and manner of using fish.

The National Federation of Avicultural Societies organises each year an "Egg Week", during which a competent training staff shows the public a number of different ways of preparing eggs and using them for food. The public can purchase the dishes at cost price.

The State Agricultural Experts' Service has co-operated in the propaganda to increase the consumption of Belgian milk and fruit.

United Kingdom.

THE MINISTRY OF HEALTH AND OTHER GOVERNMENT DEPARTMENTS.

Nutrition in England and Wales is primarily the concern of the Ministry of Health as the central department responsible for the health of the people as a whole (in Scotland, of the Department of Health for Scotland). The chief functions of the Ministry in this respect fall into two parts: supervision of the administration by local authorities of the legislation designed to safeguard the purity and wholesomeness of the food supply, and educational and propaganda work with a view to disseminating knowledge of food values and the needs of the human body. The latter function is exercised through the agency of local authorities and their public health staffs, as well as by the information which is directly made available by the Ministry. The Minister of Health is responsible for bringing before Parliament such legislation as may be necessary under these heads.

The Board of Education (in Scotland, the Department of Health) supervises the work done by local education authorities in England

and Wales, including the administration of the school medical service, for which the Minister of Health has Parliamentary responsibility.

A number of other Government Departments are actively concerned in work concerning nutrition. The Medical Research Council, for instance, has committees dealing with such matters as quantitative problems of human nutrition and accessory food factors and dental diseases; the Food Investigation Board of the Department of Scientific and Industrial Research has committees dealing with practical questions of food manufacture; and the Ministry of Agriculture and Fisheries undertakes research on nutrition questions in connection with the agricultural and marketing policies of the Government. The Ministry of Health keeps in close touch with all these activities.

THE ADVISORY COMMITTEE ON NUTRITION.

In order to be in a position to give authoritative advice and to conduct propaganda to enable the public to benefit from the results of the steady progress made in scientific research, an Advisory Committee on Nutrition was appointed in 1931 "to advise the Minister of Health on the practical application of modern advances in the knowledge of nutrition".

The Advisory Committee on Nutrition, reconstituted and enlarged, was reappointed in 1935 by the Minister of Health and the Secretary of State for Scotland "to enquire into the facts, quantitative and qualitative, in relation to 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". This Committee numbers amongst its members leading scientific authorities, physiologists, statisticians and economists.

WORK OF THE MINISTRY OF HEALTH (ENGLAND AND WALES).

Since its foundation in 1919, the Ministry of Health has always insisted upon the vital importance of nutrition as a fundamental factor in personal and public health. Two principal means are available to them. First, the education of the community in the choice of suitable food, and, secondly, the safeguarding of foods from deficiency in composition, from adulteration and from contamination.

The annual reports of the Ministry and of their chief medical officer contain much information on nutrition, both of a scientific and a popular character.

In 1921, the Ministry published a report entitled "Diet in Relation to Normal Nutrition". The object of this report was to afford useful information to medical officers of health, physicians, teachers and others who have opportunities for spreading scientific knowledge amongst the people. Also in 1921, the Ministry, in conjunction with the Medical Research Council, made arrangements for exhaustive

investigations by Dr. Corry Mann, extending over four years, into the nutritive value of milk as compared with other foodstuffs. The results demonstrated the unique value of milk. In 1932, the Ministry published two reports made by the Advisory Committee on Nutrition, "Diets in Poor Law Children's Homes" and "The Criticism and Improvement of Diets". In 1932, the Ministry issued a circular based on recommendations of the Advisory Committee on Nutrition, drawing attention to the incidence of nutritional anæmia in infancy, and of rickets and dental diseases, suggesting measures whereby these conditions may be combated, and pointing out the value of milk in the dietary of growing children.

ACTIVITIES OF THE MEDICAL RESEARCH COUNCIL.

Research work on nutrition has been very actively pursued in the United Kingdom during the last quarter of a century. These investigations, necessarily expensive, have been supported from public funds provided by the Government through the Medical Research Council.

The following are the main heads under which research has been done :

(i) Experimental investigations into the part played by various constituents of diet, notably vitamins and mineral salts, in maintaining full health and normal growth.

(ii) Clinical and pathological studies of diseases due in whole or part to deficiency of particular food substances.

(iii) Practical trials, on numbers of human beings, of the effects of improving the diet by the addition of specific constituents.

(iv) Fundamental research into the origin, distribution, chemical nature and physiological activity of the different vitamins.

(v) Work directed towards the standardisation of vitamins so that amounts of these may be quantitatively expressed both in further research and in practical therapeutics and dietetics.

(vi) Analyses of various foodstuffs in common use to determine their composition, including their content of vitamins and mineral elements.

(vii) Surveys of different sections of the population to ascertain what dietaries are in actual use.

There are few problems in nutrition that have not, at one time or another, received the attention of investigators working for the Medical Research Council. The subjects of the following reports will illustrate the fundamental nature of much of the work which has been done in the United Kingdom : Nutrition and Rickets, Nutrition and Teeth, Nutritional Anæmia, The Value of Milk, Vitamins, The Standardisation

of Vitamins, Composition of Foodstuffs, Nutritional Surveys into the Actual Diets of Different Sections of the Population.

The important additions to knowledge which have been secured by these means in the United Kingdom and elsewhere have provided a new basis for action aimed at improving nutrition.

RESEARCH WORK ON NUTRITION BEING CARRIED OUT BY LOCAL AUTHORITIES WITH THE ASSISTANCE OF THE MINISTRY OF HEALTH.

Two types of family dietary studies are undertaken, quantitative and qualitative. Their object is to ascertain the nature of the diets consumed by people in different parts of the country. The quantitative studies are conducted in a strictly quantitative manner and therefore throw light on the amounts of different foods eaten as well as on the family budgets. The qualitative studies give precise information only in so far as the nature and not the amount of the constituents of the diet is concerned; but, in regard to certain particulars such as milk, they can be relied on to give fairly accurate quantitative information.

A quantitative study has recently been carried out on sixty-nine working-class families in Newcastle-on-Tyne. Another quantitative study is at present proceeding in the West Riding of Yorkshire. Two qualified dieticians are engaged on this work and they have at present studied the diets of 155 families. This study has included workers engaged in various industries, including mining, railway works, ironworks, transport, textiles and farming.

Qualitative dietary studies are proceeding in Leeds and Glossop.

MILK NUTRITION COMMITTEE'S INVESTIGATION.

The investigation sponsored by the Milk Nutrition Committee set up in accordance with arrangements made under Section 11 of the Milk Act, 1934, is proceeding at present in Luton, Wolverhampton, Burton-on-Trent, Renfrewshire and Huddersfield. About 8,000 children aged 5-14 years, in four groups of about 2,000 each, are included in the enquiry. The children were divided at random into the following four groups in accordance with the supplements they were to receive :

- (1) The control group—the children in which receive biscuits once daily.
- (2) This group receives one-third of a pint of pasteurised milk once daily.
- (3) This group receives one-third of a pint of pasteurised milk twice daily.
- (4) This group receives one-third of a pint of raw Grade A milk twice daily.

All the supplements are given free. Before the supplementary feeding began, the children were submitted to a preliminary medical examination,

consisting of clinical examination, physiological tests and physical measurements. The supplementary feeding is to continue for at least a year, and medical examinations are to be carried out every three months. Four full-time medical officers specially instructed in the method of examination are conducting the practical part of the investigation.

INVESTIGATIONS INTO FOOD CONSUMPTION IN RELATION TO INCOME.

Investigations into the food consumption of the population of the United Kingdom at different income levels in 1934 have been undertaken by the Market Supply Committee in conjunction with the Rowett Research Institute. A report based on this work, entitled "Food, Health and Income : A Survey of Adequacy of Diet in Relation to Income", was made available in proof form for the first session of the Mixed Committee and has since been published by Sir John Orr.

The report finds that the expenditure on food in the United Kingdom amounts to £1,075,000,000 per week out of a total income of £3,750,000,000, or about 9s. per person per week out of an average weekly income of 30s. Meat and fish account for over 32% of the food expenditure ; bread and cereals for less than 9%. Meat, fish, eggs, milk and cheese, which are the sources of animal protein, account for nearly half the total expenditure. Vegetables, other than potatoes, contribute less to the total than sugar, though they are more important for health. With the exception of wheat, flour and potatoes, there has been a substantial increase in the consumption of most of the principal foods since before the war.

An examination of expenditure at different income levels leads to the conclusion that the consumption of bread and potatoes is practically uniform throughout the different income groups. Consumption of milk, eggs, fruit, vegetables, meat and fish rises with income. Thus, in the poorest group, the average consumption of milk, including tinned milk, is equivalent to 1.8 pint a head a week ; in the wealthiest group, 5.5 pints. The poorest group consumes 1.5 egg a head a week ; the wealthiest, 4.5 eggs. The poorest spend 2.4*d.* on fruit ; the wealthiest, 1*s.* 8*d.*

From these facts, the important inference is drawn that the degree of adequacy for health increases as income rises. The average diet of the poorest group, comprising 4,500,000 people, is, by the standard adopted, deficient in every constituent examined. The second group, comprising 9,000,000 people, is adequate in protein, fat and carbohydrates, but deficient in all the vitamins and minerals considered. The third group, comprising another 9,000,000, is deficient in several of the important vitamins and minerals. Complete adequacy is almost reached in the fourth group, and in the still wealthier groups the diet has a surplus of all constituents considered.

A review of the state of health of the people of the different groups suggests that, as income increases, disease and death rate decrease, children grow more quickly, adult stature is greater and general health and physique improve.

INVESTIGATION BY THE DEPARTMENT OF HEALTH (SCOTLAND).

In 1930, the Department of Health for Scotland conducted an experiment in Lanarkshire into the effect of an additional daily milk ration on the growth of schoolchildren. Some 20,000 children were included in the investigation, 10,000 of the children receiving daily a supplementary ration of three-quarters of a pint over a period of four months, the remaining 10,000 serving as controls. The results demonstrated that the addition of milk to the diet of children has a striking effect in improving physique and general health and increasing mental alertness. A report on the experiment was published by the Department of Health in 1930.

The Department published, in 1934, a report on milk consumption in Scotland prepared by Dr. Leighton and Dr. McKinlay as a result of an enquiry into the average amount of liquid milk consumed in Scottish households. It was ascertained that there was great variation in the amounts consumed in different localities. In large burghs, the figures are, in the aggregate, lower than in county districts. In individual burghs, they vary from 0.27 pint per head per day in Hamilton to 0.7 pint per head per day in Perth. In counties, the variation is also great, from 0.3 in Lanark to 1.03 in Aberdeen. The averages of the aggregates are for : (i) large burghs, 0.417 ; (ii) counties, exclusive of large burghs, 0.55 ; and (iii) Scotland as a whole, 0.479 pint per head per day.

NUTRITION PUBLICITY (SCOTLAND).

By means of " Health Weeks ", model dietary sheets and specimen meals, an endeavour is made to interest and educate the public in Scotland in the elements of nutrition. Lectures are given on the subject and leaflets distributed.

Instruction is also given through the maternity and child welfare authorities and education authorities.

A good deal is being done by private organisations and commercial firms to extend a knowledge of proper nutrition among the public. Many daily and weekly newspapers and journals also give advice. Commercial organisations—*e.g.*, the Scottish Milk Marketing Board—have issued recipe booklets showing how their particular products may best be utilised in the daily dietary. In addition, the Scottish Milk Marketing Board employs a propaganda woman officer, who addresses meetings with a view to interesting the public in the use of milk.

POPULAR INSTRUCTION CARRIED OUT BY PRIVATE ORGANISATIONS.

There are numerous private bodies devoted to the education of the public in the interests of national nutrition. The following are examples :

(a) *The Central Council for Health Education* was formed in 1927, the Society of Medical Officers of Health being largely instrumental in

establishing it. It acts as a central body to co-ordinate the methods and activities of the numerous voluntary bodies who deal with particular aspects of health education. It assists local authorities in carrying out health education, and in organising "Health Weeks" and exhibitions. It publishes a monthly journal entitled *Better Health*, which local authorities frequently use as a basis of a local health paper by incorporating local information of services available and articles of special interest to their areas.

(b) *The British Broadcasting Corporation.* — A large amount of work has already been done by the British Broadcasting Corporation in relation to public health propaganda, in which the Ministry of Health has been associated. Practical advice on diet and health and on cookery is systematically broadcast, especially for the benefit of housewives, and leaflets are published.

(c) *The National Milk Publicity Council.* — The National Milk Publicity Council was formed in 1920 "with a view to the inauguration of a campaign on national lines to instruct the public as to the value of pure milk". The Council is principally composed of representatives of the various organisations in the milk industry, but it also includes representatives of Government departments and of such bodies as the Society of Medical Officers of Health. The Council has carried on its work by means of publicity in the general and technical Press, by the issue of leaflets, recipe lists and cinema films, by broadcasting, by the encouragement of clean milk competitions and displays and demonstrations at health exhibitions, and by general lectures and addresses at factories, welfare centres and schools and under the auspices of associations such as the Boy Scouts, temperance societies and women's institutes.

The National Milk Publicity Council includes in its activities propaganda with a view to encouraging the sale at collieries and factories of half and one-third pints of milk as a daily milk service for employees. The scheme has now been adopted in a considerable number of collieries and in factories of very varied types.

Besides the "milk in schools" campaign, the Council arranges for lectures and cooking demonstrations to women's clubs and infant welfare centres, propaganda by films, organisation of intensive campaigns during Health and Baby Weeks, etc., a campaign for increased consumption of milk in workshops, factories and mines, the distribution of pamphlets, posters, etc., and lectures by travelling cinema vans.

(d) *The British Medical Association.* — As one of its widespread activities, the British Medical Association set up a Committee in 1933 to determine the minimum weekly expenditure on foodstuffs which must be incurred by families of varying size if health and working capacity are to be maintained, and to construct specimen diets. Following upon the report of this Committee, made in 1933, which contained detailed

lists of foodstuffs and of the quantities required per week by individuals and families, the Association issued a booklet in 1935 transposing the lists of raw foodstuffs into receipts and menus for family diets, which was published under the title of "Family Meals and Catering". Broadcast talks are now being given on this booklet.

(e) *The People's League of Health*. — This body has, since its inception in 1917, devoted much attention to food, its constituents and proper proportion and value to the human body, the best methods of cooking and the effects of improper diet. The League has issued in simple explanatory form pamphlets on "Diet in its Relation to Health", "Vitamins—What to eat and why", and has instituted an annual series of lectures by members of the medical profession and others.

(f) *National Federation of Women's Institutes*. — This Federation represents 300,000 country women living in the smaller villages of England and Wales. The subject of nutrition has lately occupied an important place in their educational programme, and, early in 1935, a National Conference was arranged with a view to arousing further interest in the subject amongst their members. The Federation has arranged courses in cookery and food values for students who already possess some knowledge of this subject and who are prepared to undertake teaching work in women's institutes. Lectures and demonstrations in cookery and domestic economy form an important part of their activities.

(g) *Scottish Federation of Women's Rural Institutes*. — The institutes associated in this National Federation have a membership of 50,000 women living in the small towns, villages and rural districts of Scotland.

Through the county federations, the subject of improved nutrition among the people is receiving special attention, and lectures and demonstrations in cooking and domestic economy form an important feature of the individual institute's activities throughout the year. Particular stress is laid on the incorporation of home-produced foodstuffs in the dietary—*e.g.*, eggs, fruit, vegetables and dairy products, which are derived from local sources, such as smallholdings and allotments. In some areas, special short courses have been arranged through the education authorities in the cooking of home products and their food values.

The Scottish Federation has started as a national movement a "Guild of Housewives", qualification for admission being the result of tests and examinations in cooking and knowledge of nutritional values.

NUTRITION INSTRUCTION IN SCHOOLS (ENGLAND AND WALES).

The instruction of the pupils attending the various types of schools in the principles and practice of rational nutrition is allied to the general instruction given in domestic subjects, including cookery. Domestic

instruction is given to about 90% of girls over 11 years of age in the public elementary schools. About 80% of the girls in grant-earning secondary schools receive some such instruction, chiefly between 12 and 14 years of age. There is fairly extensive provision in evening classes, some 90,000 persons taking instruction in cookery and allied subjects.

NUTRITION INSTRUCTION IN SCHOOLS (SCOTLAND).

Steps have been taken to extend and intensify the teaching of cookery and related subjects in Scottish schools.

Practically every girl before leaving school at the age of 14 years has had a course of domestic science, and girls are encouraged to take cookery as one of the subjects for the Day School Certificate (Higher) before leaving at the end of 15 years.

In 1933-34, there were 14,622 pupils (out of 93,535 on the roll) in the secondary departments and 689 in the primary departments who received instruction in cookery in 1935, out of 251 secondary schools. Within recent years, an interesting development in many secondary schools has been the institution of intensive courses in domestic science; varying from two to twelve hours per week during that part of the last year of the secondary course following upon the leaving-certificate examination, for pupils who have not previously studied that subject during their secondary course.

Of a total continuation class enrolment for the session 1934-35 of about 140,000, the number of students enrolled in cookery classes was 17,799. For the most part, the instruction given was of a plain, useful, everyday character, adapted to the needs of the students concerned. The purpose of these classes was to give instruction in courses of a shorter and more informal type than the regular cookery classes, and as far as possible under actual home conditions. In particular, the needs of the small cultivator, in whose diet vegetables necessarily play an important part, were considered in the conduct of these classes.

Bulgaria.

A Commission is attached to the Directorate-General of Public Health for the study of all questions relating to rational nutrition. The results of these studies will be published and the Commission's recommendations and conclusions will supply the guiding principles in carrying out the work undertaken by the Directorate-General of Public Health.

The Directorate-General has expressed the opinion that a more general knowledge of nutrition questions would help to increase the consumption of the country's food products of vegetable and animal origin. It is only necessary to mention the excellent results obtained by propaganda for encouraging the consumption of grapes, as a result of which the consumption of fresh grapes has increased every year, as has production. Reference should be made to the very successful efforts of the services of the Ministry of Agriculture and State Domains, which does useful

work in the matter of nutrition through the medium of its own organs and of the institutes under its direction.

Steps are taken to supplement education in the matter of health by means of lectures by doctors, wireless lectures, Press articles, popular scientific publications, posters, etc., one of the principal subjects being rational nutrition.

Canada.

In Canada, voluntary organisations, local welfare units and city health departments, in addition to provincial Departments of Agriculture and Federal departments concerned with the marketing of special products, such as fish, etc., all carry on a constant educational programme. These programmes, which are not closely co-ordinated, are based on professional and technical knowledge.

Denmark.

ADVISORY NUTRITION COMMITTEE.

In Denmark, the Public Health Department has, for long devoted attention to public nutrition, and in particular to the defects which have appeared in recent years. With a view to carrying on work in this respect on the best possible basis, the department arranged for the appointment, on December 13th, 1935, by the Ministry of the Interior, of a special expert nutrition committee to give advice to the department. This committee consists of Danish experts on nutrition and foodstuffs.

EDUCATION.

There are in various parts of the country a number of domestic science schools which are an outcome of the Danish People's High School (Folkshojskole) and are usually conducted on similar lines. In these schools, attention is also given to the nutrition aspect of domestic science. In addition, there are domestic science training colleges for women teachers, at which, naturally, instruction is also given in the science of nutrition.

Lastly, a number of private associations and bodies (housewives' associations, domestic science associations, agricultural associations and smallholders' associations) have appointed special consulting experts in domestic science to advise the members of the associations on all questions relating to house-keeping, including the problem of nutrition.

RESEARCH.

Under Law No. 159 of May 11th, 1935, a domestic science board has now been appointed to co-operate with organisations working on subjects of interest for domestic science from the point of view of nutrition, health and technical and economic questions. It also arranges

for research work either in co-operation with the institutions and organisations concerned or in its own laboratory, if such a laboratory is established. The board can also have research carried out at such other laboratories as it may select. The board is to publish the results of its work.

The Public Health Department is represented on this board, especially for the purpose of looking after the board's public health work, which relates principally to nutrition problems.

Estonia.

In Estonia, the principles and practice of popular nutrition are disseminated through the medium of the following organisations :

- (1) Maternity and infant consultation centres, where mothers and educationists receive directions and instruction on the nutrition of infants and young children and there is a periodical inspection in order to watch over the development of children ;
- (2) The Estonian Health Museum, which organises exhibitions and conferences on health and popular nutrition ;
- (3) Universities for the people, women's organisations, domestic science schools, etc., which organise various popular courses and lectures on nutrition.

Finland.

The extent to which food bulks in the national economy is illustrated by the fact that the Finnish people spend on food more than half the national income, which is estimated at about 20,000 million marks. In the poorer families, food accounts for two-thirds of the household expenses, but, in the well-to-do families, for only one-third or a quarter. Calculated per consumption unit, food costs from 8 to 12 marks a day in workers' and peasants' families. For example, in those farms where accounts are kept, the figure was 7.83 marks a day in 1932, though it had been 10.88 marks a day in 1928. In the poorest working-class families, the average daily cost of food was 10.05 marks in 1928.

RESEARCH.

The Central Union of Agricultural Societies now has a Domestic Economy Committee, which is preparing for an extensive enquiry in thousands of families in order to ascertain what foodstuffs are given preference by the agricultural population and what is their value from the standpoints of physiology, cookery and prices. The Marttas societies have also made limited enquiries in this field, and the Agricultural Economy Research Bureau of the Department of Agriculture has investigated the farmers' diet in connection with its enquiries into the possibility of making agriculture pay.

EDUCATION.

Instruction in the subject of human diet may be said to be better organised than scientific research into the same subject, for schools of domestic science and institutes of domestic economy have existed for some decades. In 1934, there were 42 of these establishments, with 278 teachers and 1,826 pupils. The annual Government grant to these schools approaches seven million marks. Domestic economy is also taught in the People's Institutes, and to some extent in the secondary and elementary schools. In 1933, there were 57 People's Institutes, with 2,026 pupils, of whom 1,950 were girls. In the same year, there were 216 secondary schools for girls, with 26,236 pupils. The number of rural elementary schools was 5,368, with 227,946 pupils, of whom 111,883 were girls. The urban elementary schools comprised 1,603 classes, with a total of 52,127 pupils, of whom 25,413 were girls. Lastly, there are now 253 school medical officers and 163 school nurses, who also give advice on dietary questions.

The institutions which teach domestic economy, however, reach only a small fraction of the total number of housewives ; greater importance attaches to the advice given on the subject by certain organisations. These include the Marttas Society, which has about 60,000 members, and the women's sections of the agricultural societies, which comprise nearly 40,000 "women agriculturists", together with the women's organisations of the smallholders' societies, the communal domestic economy committees, and the Socialist women's domestic economy sections. Their work for the introduction of a rational diet is becoming more and more effective every year.

So far as children are concerned, the Union of Agricultural Clubs has undertaken to give advice on diet. The Union now has nearly 25,000 girl members.

POPULAR INSTRUCTION.

For nearly three years past, the Ministry of Agriculture has been devoting its attention to problems of popular nutrition ; it has printed, among other papers, instructions for advisers in domestic economy, and has published a cookery book for the use of the poorer families. Hundreds of thousands of marks have also been spent on stimulating the consumption of agricultural produce, especially the products of stockbreeding. The grants to household economy and domestic science institutions have also been increased.

All this, however, is not enough ; it is urgently necessary to undertake extensive action with a view to raising the standard of popular nutrition and directing the agricultural production of the country into channels which will, as far as may be possible, allow of an appropriate dietary based on home produce.

France.

NATIONAL COMMITTEE FOR THE STUDY OF NUTRITION.

The French Government has always taken a deep interest in social questions and had the welfare of its important agriculture at heart. It has therefore given close and unceasing attention to the various aspects of the problem of nutrition.

Nevertheless, past and present research and action in this complex matter would seem to have been lacking in co-ordination—a fact which the depression has clearly brought out.

It was to make good this defect, while at the same time complying with a suggestion of the Mixed Committee on Nutrition, set up by the Council of the League of Nations, that a National Committee for the Study of Nutrition was set up on the initiative of M. Paul-Boncour, Minister of State and Permanent Delegate of France to the League of Nations.

The National Committee for the Study of Nutrition held its first meeting on April 2nd, 1936, with M. Paul-Boncour in the chair, assisted by the Minister for Public Health, and M. Queuille, former Minister and representative of France on the Mixed Committee at Geneva.

The Committee consists of representatives of the Prime Minister's Office, the Government departments concerned (Public Health, Agriculture, Commerce, National Education, War, Navy, Colonies, Labour, Finance, Foreign Affairs and Public Works) and of the chief scientific, agricultural, labour and commercial organisations, etc., specially concerned with the problem of nutrition.

Taking the view that its task was twofold—to co-operate effectively with the League of Nations and to collect all such material as might be useful to the latter, and to lay down the main lines of a national nutrition policy in accordance with the present state of scientific knowledge, the possibilities of educating public opinion, economic considerations and the possibilities of effective supervision, the Committee entrusted the preparatory work in these various respects to four commissions :

(1) A scientific commission, presided over by M. André Mayer, professor at the Collège de France (Mme. Randoïn, laboratory director at the School of Advanced Studies, Rapporteur) ;

(2) A commission on education and practical application, presided over by M. Luc, Director-General of Technical Education (M. Paul Devinat, Inspector-General, Rapporteur) ;

(3) An economic commission, presided over by M. Jules Gautier (M. Vimeux, Secretary-General of the National Federation of Agricultural Mutual Benefit and Co-operative Societies, Rapporteur) ;

(4) A commission on the inspection and control of foodstuffs, presided over by M. Serge Gas, Director of Public Health (Dr. Xavier Leclainche, Rapporteur).

SCIENTIFIC RESEARCH.

Existing Centres for Study and Scientific Research concerning Human Nutrition.

The following centres have been in existence in France since 1922 :

(1) A Nutrition Research Centre in Paris, which is under the authority of both the Ministry of Agriculture and the Scientific Nutritional Hygiene Society (recognised as being of public utility by the Law of July 7th, 1904). This centre comprises three research laboratories :

- (a) A nutritional physiology laboratory ;
- (b) A bio-energetics laboratory ;
- (c) An experimental station for research on the nutrition of live-stock ;

(2) Research laboratories under the authority of the Ministry of National Education (faculties of science and medicine, Collège de France, School of Advanced Studies, Conservatoire national des Arts et Métiers), in various university towns, more particularly Paris, Lyons, Marseilles and Strasburg.

(3) A centre for instruction on the subjects of foodstuffs attached to the Conservatoire national des Arts et Métiers.

Proposals and Desiderata for the Development of Studies and Scientific Research regarding Human Nutrition.

Although for the purpose of surveys and enquiries regarding nutrition the laboratories specialising in nutritional research have always kept in touch with the Academy of Medicine—which since November 1935 has been responsible for collecting the opinions of technical experts interested in the various aspects of the nutrition problem—the researches of all these laboratories have hitherto been independently conducted.

Proposals are at present under consideration in France for the creation of a new organisation to make use of all the existing possibilities—that is to say, to group the laboratories in question, co-ordinate their efforts and supply them with funds, while at the same time naturally leaving each of them in enjoyment of the independence of mind which is necessary for scientific research.

Considered as a whole, the new organisation would represent a National Institute of Nutritional Hygiene, to which would be directly attached :

- (1) A national centre for research and advanced teaching with regard to rational nutrition, which would be formed by the extension of the present Research Centre ;
- (2) The various laboratories working under the Ministry of National Education.

This organisation would be able to undertake the study of all scientific questions relating to nutrition problems in France and her colonies.

The creation of such a national centre would, moreover, be of the greatest value in ensuring the co-ordination of the various forms of instruction in the science of nutrition.

EDUCATION AND POPULAR INSTRUCTION.

Application of the Results obtained by Scientific Research with a View to Advanced Instruction on Nutrition.

1. There are at present two institutions in France specialising in advanced nutrition studies : the Foodstuffs Centre of the Conservatoire national des Arts et Métiers and the Scientific Nutritional Hygiene Society.

(a) *Foodstuffs Centre of the Conservatoire national des Arts et Métiers.*

In 1932, a Foodstuffs Centre was set up at the Conservatoire national des Arts et Métiers by agreement between the latter and the Union of Wholesale Provision Dealers' Societies. The purposes of this centre are :

- (1) To set on foot investigations of all kinds regarding foodstuffs, their origin, physical and chemical characteristics, composition, industrial uses and place in normal and therapeutic diets ; the centre possesses a laboratory specially equipped for such work ;
- (2) To make known the results obtained through such research by a series of lectures.

Thus interpreted, the teaching given appears as the extension of certain courses already given at the Conservatoire—*i.e.*, the courses in agriculture and agricultural production, mineral chemistry, agricultural and biological chemistry and industrial chemistry. At the request, however, both of the students themselves and of the trade associations, the Conservatoire has decided to introduce as a preliminary to the session proper, a course of instruction designed to prepare students for the specialised studies which are to follow.

The lecturers are chosen from among the scientific authorities most highly qualified in matters of rational nutrition.

The courses are public and are, in principle, intended for members of the staffs of provision and catering firms.

Half of those attending the courses are drawn, however, from other circles and include : students at the universities and schools of higher studies, B.A.'s, pharmacists, agricultural engineers, veterinary surgeons, chemical engineers, etc.

A certificate is already awarded to those who have regularly attended the courses and successfully passed the final examination.

(b) *Scientific Nutritional Hygiene Society.*

Like the Foodstuffs Centre, this society, which was founded in 1904 and declared to be of public utility, is intended for both the study and teaching of the sciences in their application to nutrition. For this purpose, it organises theoretical courses and, unlike the Foodstuffs Centre, practical classes for both normal and dietetic cookery.

The courses consist of ninety-eight hours of instruction annually and pupils are charged a fee. These courses are followed each year by some twenty pupils of various origins, half of whom belong to the Higher Normal School of Technical Education (Science-Domestic Economy Department).

The Scientific Nutritional Hygiene Society possesses well-equipped laboratories, which can also be used for teaching purposes.

2. The Ministry of Agriculture also evinces keen interest in the dissemination of knowledge so closely concerning the country's agricultural economy. It subsidises the Scientific Nutritional Hygiene Society, which is under its patronage.

Even though they do not form the subject of special courses, questions of nutrition are dealt with in the schools of advanced studies under the Ministry of Agriculture, and more particularly at the National Agronomic Institute, the National Schools of Agriculture (microbiology, zootechnics, agricultural technology, fruit nutrition and aquiculture) at the National School of Agriculture, Versailles (the cultivation of fruit trees) and at the National School of National Industries, Douai (sugar production, brewing and distilling).

3. In the last place, it may be pointed out that the Ministries for War and the Navy have for their own purposes instituted courses of advanced instruction in nutrition at the higher supply service (Army) and Commissariat (Navy) Schools and at the practical training-schools of the army and naval health services.

4. In conclusion, it may be said that, at the present time, properly organised advanced teaching on nutrition does not exist in France.

The Foodstuffs Centre and the Scientific Nutritional Hygiene Society, though unconnected with each other, have identical aims. The pupils attending their courses are both heterogeneous in origin and too few in number.

The public authorities are at present engaged in an attempt to improve the teaching of nutritional hygiene ; to ensure greater coherence between the establishments controlled by the Department of National Education ; to provide stricter supervision of the instruction given ; to work out schemes for systematic advanced teaching of nutrition under the Directorate-General of Technical Education, which is the department most interested in its development ; to create and organise the profession of dietetician ; and, in the last place, to ensure by administrative action

and the necessary publicity that the courses shall benefit a wider public and one more likely to derive advantage therefrom.

At the same time, the authorities are anxious to encourage in every way the assistance given by outside bodies, such as the trade organisations and centres of scientific research.

Dissemination of Information on Nutrition.

5. The rules of scientific nutrition cannot be applied unless appropriate instruction is given, in the first place, to the housewives of to-day and to-morrow, and, in the second place, to the various categories of persons responsible for collective catering.

The dissemination of such knowledge, therefore, requires the organisation of instruction in household management and also of technical instruction.

Instruction in Household Management.

6. Instruction in household management is designed to supply future housewives with the theoretical and practical knowledge necessary to enable them to perform their various home duties.

Such instruction is given in a practical form both by the State and by private organisations.

Public Education.

7. State instruction in household management is at present given in the educational establishments under the authority of the Department of Elementary Education, the Department of Secondary Education, the Ministry of Agriculture and the Directorate-General of Technical Education.

(a) *Elementary Education.* — 8. The Directorate of Elementary Education has always been aware of the importance of domestic economy teaching in the establishments under its control. The instructions of June 20th, 1923, regarding the new syllabus of studies for elementary schools include the following :

“ In girls' schools instruction in household management should occupy an important place. By combining the various classes included in the syllabus, it is possible to devote one half-day each week to the teaching of household management and kindred subjects.”

Or again :

“ School-mistresses are aware how important it is for the good of France that its children should be preserved to it, intelligently looked after, safeguarded and protected against disease. They should therefore devote themselves wholeheartedly to the education of those who will be the mothers of the future.”

Such teaching is of an essentially practical character, and theory is only included to explain practice, or to imbue the girls with love for the home and for the modest and yet noble domestic tasks which they will be called upon to perform.

Similar aims are evident in the syllabus of the higher elementary schools and teachers' training schools.

9. This insistence upon really practical domestic economy instruction has grown more pronounced in the last few years. In the large towns, and particularly in the Department of the Seine, suitably equipped classrooms under specially qualified mistresses have been opened.

In the rural areas, the Department of Elementary Education has made an attempt, in conjunction with the Ministry of Agriculture, to develop continuation courses in household management, and in these classes teaching on nutrition has come to occupy a very important place. The co-operation of the Department of Technical Education under the Decree of June 1934 makes it possible to carry on such instruction in the continuation classes.

10. The extension of the school age would have an excellent effect upon the development of training in household management, which might then be introduced throughout the country.

Although the children are too young for their mistresses to inculcate any but the very simplest ideas, at least in the elementary schools, the spreading of practical knowledge, even in the most modest homes, could not in the long run fail to exert an excellent influence on the methods of housewives.

In this connection, the elementary schools—even without the specialisation which could scarcely be expected of them—can make a vital contribution to the improvement of public health, particularly in the matter of nutrition.

(b) *Secondary Education.* — 11. Domestic economy is not included in the secondary-school syllabus. Nevertheless, as the result of local initiative, optional classes in cookery and household management have been organised in certain of the girls' lycées.

(c) *Agricultural Instruction.* — 12. Domestic agricultural training is at present given either in the fixed or travelling schools of rural housekeeping or in temporary classes, with a short term of instruction in special subjects, such as domestic economy and cookery. Nutrition teaching occupies an important place in the syllabuses of all such classes.

In schools of rural housekeeping, the syllabus generally followed is that of the National School at Coëtlogon, after adaptation to the social background and average intelligence of the pupils.

Such instruction is of an essentially practical nature; the pupils take their midday meal in common and, in the boarding establishments, the evening meal also. They prepare their meals themselves under the

supervision of the instructor, after studying its composition and deciding upon the bill of fare. They then calculate the cost, which is shared among them.

In the continuation courses in rural housekeeping given by women teachers holding the certificate in rural housekeeping awarded by the Ministry of Agriculture, instruction on nutrition is given in accordance with a general syllabus drawn up by the Minister for Agriculture. In these classes, the midday meal is taken in school whenever possible; it is prepared by the pupils, who share the cost.

Remarkable results have been obtained in certain rural areas by the travelling schools of domestic science, which, unquestionably, have already contributed to the improvement of local habits in the matter of nutrition.

(d) *Technical Education.* — 13. Since 1920, and particularly since 1925, when the scheme for the extension of technical education was first introduced, the Directorate-General of Technical Education has always given training in household management its closest attention.

It has planned such training on the most comprehensive lines, considering it as an indispensable means of reconciling the home duties of women with their outside work and also, through instruction in mothercraft and well-balanced nutrition, as a means of maintaining and improving the health of the race.

14. At the end of the war, domestic economy teaching was almost unknown in France, but its introduction was brought about almost spontaneously through the reconstruction of the devastated areas. During the war, the distribution of food to the inhabitants of the occupied departments had necessitated their organisation, and this was continued for the purposes of reconstruction. For the permanent organisation of such instruction, however, guidance had to be sought abroad, more particularly in Belgium and Switzerland, and from the material collected it was possible to perceive along what lines such instruction should be organised. Provisional syllabuses were drawn up and tested by experience. The teaching staffs made use of the data thus collected, and, after a period of experiment, worked out the essential principles of teaching household management as given to-day.

An "Educational Week", organised in connection with the Domestic Arts Exhibition in 1927, made it possible to collate the results of this initial period, to deduce a body of general principles and thus to codify, as it were, the new domestic science teaching. Booklets were issued for the guidance of teachers in the organisation and management of their classes.

15. The programme thus drawn up in the light of experience includes every aspect of "housekeeping" and questions of nutrition are given an important place. It combines practical work with theory and each practical exercise is preceded by a short lesson.

The teachers endeavour to avoid curtailing or stultifying such teaching and to prevent its coming to consist of no more than a few commonplace recipes or falling to the level of little girls' play. Their aim is to see that it is not confined to the narrow limits of the school-building, but that, on the contrary, emphasis is laid upon its practical importance, its reality, its moral and social value. To make it accessible to all and to facilitate its introduction into all types of home, such teaching is given in the most varied forms, according to the age, occupation, means, general education and mode of life of the persons for whom it is intended.

The minimum age of pupils is 14 and the programme of work is both rational and carefully adapted to the pupils' capacity.

16. For the application of this programme of teaching, the Directorate-General of Technical Education has introduced three types of organisation. Training in household management is thus provided, not merely for school pupils, but also for working and peasant women, girls and young women of the middle-classes.

(a) The first type consists of practical schools for girls.

Apart from the schools already in existence, new schools specially intended for instruction in household management have been opened and model domestic training organisations with special classrooms with the necessary equipment have been set up in as many as possible of the public technical schools. The courses are open, not merely to pupils of the schools, but also to outside pupils. Any body wishing to organise instruction in household management may there obtain the necessary information.

(b) In all the communes where women's occupational courses are already in existence, the Directorate-General of Technical Instruction, in agreement with the municipal authorities, has studied and carried out the organisation of classes for the benefit of outside pupils, as well as of the regular pupils of the schools.

It has helped with the installation of special equipment or even with the erection of genuine schools of household management, open to pupils of all schools without discrimination.

(c) It was from the outset apparent that, in order to obtain conclusive results, an attempt must be made to place the pupils in conditions approximating as closely as possible to everyday life.

With a view to giving the most practical teaching possible, the Directorate-General of Technical Education decided to build model houses identical with the workmen's dwellings built in the neighbourhood. Five of these model houses are already in use.

17. The result of these efforts may be summarised as follows :

At the present day, teaching in household management in France is given in all the girls' practical schools of commerce and industry, and,

in Paris, in all the municipal vocational schools. In addition, there is a private household management school under the Department of Technical Education, the pupils of which may obtain scholarships from the authorities.

The importance of the various schools of household management and the progress made since 1927 may be judged from the following table :

	1927	1935
Number of classes	27	55
Number of pupils	1,434	5,465

The State's efforts in the course of the last ten years to organise genuine domestic economy teaching is proof of the great benefits to be derived from this form of education. The training of the housewife, the maintenance of the unity of the family, the protection of the national stock against alcoholism and infantile mortality—such are the valuable results of this new departure.

18. There exists therefore in France an effective means of disseminating among members of the public knowledge regarding rational nutrition. In practice, it is sufficient to give schoolteachers general instruction in accordance with the most recent scientific data to secure the wide dissemination of genuinely useful knowledge.

The way has been prepared, the system perfected, and methods well tried by experience, so that all that is now required is a more definite policy, and the appropriation of more ample funds to give the work new impetus.

This would all be easier if the activities of the authorities at present concerned in the development of domestic economy teaching in France were more effectively co-ordinated.

The creation of a body to co-ordinate and supervise the various forms and syllabuses of domestic economy teaching is, moreover, under consideration. Such a body would be especially well qualified for promoting the dissemination of methods of rational nutrition among the general public.

Private Education.

19. Apart from official action, the Directorate-General of Technical Education has endeavoured to promote the foundation of schools of household management by occupational organisations. To this end, the Permanent Commission of the Higher Technical Education Council has authorised the appropriation of sums equivalent to 10% of the amount of the fees due from all apprentices taking household management courses.

The progress achieved as the result of this measure was, in the first place, inconsiderable; State propaganda in the form of model courses, lectures and the constant collection of up-to-date material was nevertheless bound to bear fruit.

Such propaganda was actively supported by the associations specially created for the purpose of assisting the development of this new type of education. The French Federation for Domestic Economy Teaching contributed to the work, and even endeavoured to extend it to the French colonies.

Bodies of all kinds have gradually but systematically brought into being organisations, the numbers and efficiency of which are constantly increasing.

20. Among the more important, we may mention the activities of the mining companies. All the more important companies in the central areas of France have set up courses on household management. Unfortunately, it is difficult to give exact particulars of the number of pupils and the results obtained.

In the mines of the Pas de Calais, there are at present sixteen centres for the teaching of household management, attended by 978 girls or young women.

The railway companies have also made valuable efforts in the same direction. The P.L.M. Company has organised four domestic economy centres. It subsidises the Family Domestic Training Office, which organises courses on household management for the wives and daughters of railway employees in all the larger towns along the company's lines.

The State Railway Company has founded fourteen centres of the same kind for the daughters of the railway employees; it has also organised special courses for adults and married women.

The P.O.-Midi Company and the Northern Company have created fifteen courses with 500 pupils and twenty-two courses with 330 pupils respectively.

In this connection, it should be mentioned that the Caisse de Compensation of the Paris region has organised more than 100 courses, followed by 1,700 pupils, and that the Office familial ménager has also the same number of pupils.

21. The total amount represented by the exemptions from the apprenticeship tax granted to finance classes on household management is between 1 and 1½ million francs, not inclusive of the Department of the Seine.

Many strenuous attempts have therefore already been made to organise private classes in household management.

Promoted in general by the State, they have all been successful, thanks to its example and support.

22. At the same time, it must be acknowledged that the geographical distribution of these centres is not governed by any general plan, and certain areas are still entirely unprovided for.

Furthermore, the public authorities should be empowered to establish the necessary supervision over such private classes, so that training in household management may be kept up to its present level of efficiency.

Here, too, co-ordination must be introduced, though without interfering with private initiative.

Training of Teachers.

23. The practical value of nutrition teaching in France depends upon the training of the instructors.

In the absence of a policy based upon scientific data and guiding principles common to all grades of education, the training of instructors must at present be admitted to be somewhat unequal.

(1) *Elementary Education.* — 24. The elementary-school teachers are trained in the teachers' training colleges. In the latter, the three years' syllabus includes one hour's instruction in domestic economy, comprising not less than twenty lessons of one hour each of instruction in nutritional hygiene (types of water, drinks, food, puericulture). Four hours a week are spent on household work during each of the three years of the course.

It should be noted that the official instructions emphasise the importance to be attached to these subjects. It may be added that specially qualified teachers are trained at the National School at Coëtlogon, and at the Agricultural Institute, Toulouse. Furthermore, the scheme for the reform of the training colleges at present under consideration provides that much more time shall be devoted in the time-table and syllabus to the training in domestic economy of future schoolteachers.

(2) *Rural Education.* — 25. The staff responsible for instruction in rural housekeeping is recruited from former certificated pupils of the National School of Agriculture for Girls and the Higher Training Department for Domestic and Agricultural Teaching at Coëtlogon, near Rennes. At the Coëtlogon School, there is a special Department of Nutrition and Cookery. The main heads of the syllabus of this department are to be found in the annex.

(3) *Technical Education.* — 26. The teaching staff of the household management schools under the Department of Technical Education is trained at the Vocational School at Limoges, which trains teachers for the domestic science schools of the city of Paris; at the Municipal Domestic Science School in the rue Belleyme, where staff is trained for the same schools; at the National Vocational School, Poligny, and at the Department of Technical Education's Higher Training School.

As an example, we may point out that the pupils of the latter school are selected and trained as follows :

Entrance to the school is by competitive examination, and all candidates are required to hold either the higher elementary certificate, the *baccalauréat*, or the secondary leaving certificate. Apart from studies designed to improve their general education, their first year at the school includes a period of two weeks at the Porchefontaine-Versailles Crèche, and they attend classes and lectures at the Scientific Nutritional Hygiene Society. The second year includes four hours weekly of instruction in domestic science, with practical work in one of the city of Paris vocational schools.

It should be noted that teaching posts at the practical schools of commerce and industry can only be obtained by teachers having followed the above course of training and in possession of the teaching diploma (science, domestic subjects section). The former pupils of the Limoges Vocational School or the Municipal Domestic Science School in the rue Belleyme are only eligible for posts in the city of Paris schools or in private establishments.

(4) *Private Education.* — 27. The teachers responsible for household management teaching in private schools possess the most various qualification, and, as their classes are not under State supervision, it is impossible to give any reliable account of their previous training.

28. It is highly regrettable that the training of future teachers should be so very different, even when their pupils are likely to be of the same standard of intelligence. The best means of changing this state of affairs would be the drawing-up of a syllabus by the Directorate-General of Technical Education and the other authorities concerned in conjunction with the research institutes and higher educational authorities. This syllabus should be compulsory for all teachers of domestic subjects. It should lead up to a diploma and be supplemented by practical work whenever possible.

Proposals to this effect are at present under consideration. They may perhaps be put into effect in connection with the reform of higher nutritional studies referred to above.

Vocational Training.

29. Vocational training, at least within the scope of the present report, has a number of highly different aspects.

In the first place, the Department of Technical Education has set up a special school for hotel-keeping, at which not only the administrative staffs, but also chefs and their assistants are trained.

Furthermore, the army and naval authorities who are responsible for the feeding of soldiers and sailors have long been careful to instruct officers in their duties in this respect and to train the necessary specialised cooks.

It is these two cases which furnish the best example of the methods of vocational training in the matter of nutrition which are, or at least would be, widely applied in other quarters also.¹

Training in Hotel-keeping.

30. The Central Board for Technical Instruction has opened practical schools for hotel-keeping in the districts which derive a large proportion of their income from tourists.

The chief concern of the teachers here is not to impart the rules of systematic, normal or dietetic nutrition, but rather to train pupils for carrying out the professional duties of hotel-keeping, to make them, when they leave school, useful assistants who will later become good managers.

In these practical schools, the teaching has the same features as in all public technical training schools. It is devised to give the pupils both a general education and professional training. It is based on the experimental method and keeps in permanent touch with the profession. During the holidays, the pupils of the school work as paid apprentices in the big health resorts, watering-places or climatic stations.

The course of study lasts for three years and terminates with an examination conferring the "Brevet d'Enseignement Hotelier", first class.

A second-class "Brevet" may also be subsequently conferred under certain circumstances.

31. The training given is thus a sound one. At the same time, it has to be admitted that theoretical instruction in French, arithmetic, tourist and hotel geography, modern languages and political economy, does not leave sufficient room for the teaching of the science of nutrition.

Though some of the practical training is concerned with cooking, its purpose would seem to be to teach the pupils to prepare certain dishes rather than to impart the principles of rational nutrition.

The dissemination of these principles by means of technical training in hotel-keeping would therefore entail a change in the curriculum.

The Central Board for Technical Instruction is prepared to take this step. It had already intended, in organising the new Paris school for hotel-keeping, to allow for the interest at present taken in dietetics.

It is certainly essential for France, a country of health resorts, to be able in the future to give the persons visiting its various health resorts as sound guarantees as other countries for the observance of the diets prescribed by doctors. A great effort will have to be made in this direction to bring back to France visitors who have been rendered more exacting by the attention paid to them elsewhere.

¹ At the request of the Minister of National Education, the Minister of Public Health set up, by a Decree dated June 3rd, 1934, a special commission to study the progress made in the matter of hygiene in the public secondary educational establishments.

This commission drew up rules subsequently communicated to the heads of all such establishments.

The inspectors-general of secondary education are responsible for their strict application.

It should not, however, be forgotten that, while training in hotel-keeping may, owing to the professional quality of its pupils, be an excellent means of disseminating knowledge of the methods of nutritional hygiene, and though the hotel providing special diets must occupy a larger place in the profession, the average hotel-keeper will always have to cater for the wishes and tastes of his customers.

Army.

32. One of the duties of the Army Supply Service is to control and administer the supplies department. It has always been anxious to give the rank and file the benefit of the scientific progress made in the hygiene of food within the limits, of course, of the funds available. It has therefore made a point of carrying out research into the nutrition of the troops, teaching officers of the Supply Service and medical and regimental officers the essential principles of a healthy, rational and palatable dietary, of selecting and training cooks, organising competent and effective supervision of the quality of foodstuffs and the value of the bills of fare compiled by the officers in charge of the commissariat.

This brief survey need not do more than indicate the measures taken by the National Defence Department to give both officers and men in charge of the commissariat the knowledge necessary for the rational feeding of the troops.

(a) *Instruction given to Officers.* — 33. This instruction is given :

- (1) At the Higher Army Supply Service School ;
- (2) At the Training School of the Army Medical Service ;
- (3) In military colleges.

The training given at the Higher Supply Service School is intended for captains admitted to the school by examination who, on graduating, are drafted to the Supply Officers Corps.

The study of foodstuffs is one of the chief subjects in the curriculum. Two Army Supply Service officers qualified by reason of their duties at the General Inspectorate of Supplies are responsible for the training of pupils. Their teaching is supplemented by a lecture on preserved meat given by the Army Veterinary Surgeon, Director of the Laboratory for Research and Inspection of Army Tinned Foods, and by visits paid to manufacturing concerns.

The programme also includes lessons on the theory of nutrition and foodstuffs. At present it comprises six lectures and two practical lessons on hygiene and energetics.

To this training, given under the auspices of the General Inspectorate of Supplies, should be added that given by the Director of the Tinned Food Research Laboratory to veterinary lieutenants attached to factories producing tinned meat for the army.

34. At the Training School of the Army Medical Service (Val-de-Grâce), the physiological principles of nutrition and their application to the army play a leading part in the nutrition courses given to lieutenants in the Army Medical and Army Pharmaceutical Service in view of their duties as technical advisers to the Army Command.

During their year of training at the Army Medical Service Training School, army pharmacists are given practical lessons daily in the analysis of foodstuffs.

Lastly, as bills of fare have to be compiled by the officers commanding units, it is necessary for regimental officers to know, if not the physiology and chemistry of nutrition, at any rate the practical conclusions to which these sciences lead. These conclusions are expounded during the course on army hygiene given in military colleges.

(b) *Training of Cooks.* — 35. Army cooks are trained as follows : in each command area the General commanding the area organises a cookery training course.

The course lasts for three months and the training is essentially practical. The lessons are given by the head cook of a corps, under the supervision of a specially qualified officer.

Verbal instruction includes four lectures by the officer and two by an army veterinary surgeon.

At the end of the course, the pupils are classified, on the basis of an examination, as cooks or assistant cooks.

Since 1909, there has been in existence a " Handbook of Garrison Military Cookery ". This handbook, which has been repeatedly brought up to date, includes about 200 recipes. Each recipe is set out in quantities sufficient for 100 men.

Navy.

36. As in the army, the naval authorities are faced with two tasks :

- (i) To train officers to supervise and run messes ;
- (ii) To instruct the staff responsible for preparing meals.

(a) *Training of Officers.* — 37. Since to the Paymaster generally falls the important task of running the mess, the School of Paymasters gives its pupils special training on this subject.

They are given instruction in dietetics and how to recognise the suitability of foodstuffs for human consumption. They work for various periods in the victualling services and are also shown the practical tests to which all foodstuffs are subjected.

Naval officers who may have to run messes are also given this training, both at the " Ecole Supérieure de la Marine " and in the training-ships.

Naval surgeons attend special courses on nutritional hygiene at the Bordeaux Faculty of Medicine, and the " Ecole Principale " of the Medical Service.

At the " Ecole d'application " at Toulon they also attend a course of naval hygiene, several lessons of which are devoted to nutrition questions.

These students also visit the slaughter-houses and victualling services.

Naval pharmaceutical chemists are trained at the Bordeaux Faculty of Medicine, and receive special instruction in the analysis of foodstuffs, in the form of lectures and practical work organised by the "Ecole Principale" of the medical service.

Moreover, at the Toulon "Ecole d'application", pharmaceutical chemists study for a period in the foodstuffs laboratory, attend lectures and practical demonstrations and participate, like naval surgeons, in instructional visits.

(b) *Training of Cooks.* — 38. Since 1926, cooks have been recruited in the navy among men who have already had experience, and who, after passing a test, receive a cook's certificate, or among conscripts or volunteers who, after suitable training, obtain the same certificate.

39. Though some knowledge of rational nutrition is indispensable among the officers responsible for management, there is probably little utility in imparting such knowledge to those who have to deal with the actual cooking.

The latter will always have to act on instructions received from their superiors. The training of these superiors is therefore the most important point. In the case of both hotels and restaurants, the managers are those who must be trained in the first place, if sound dietetical principles are to be popularised. This is the lesson we can learn from the policy followed by the army and navy.

40. Military and naval experience leads to the belief that the public authorities should insist on an equally thorough theoretical and practical training for all officials responsible in any way for the feeding of children or adults: bursars of public schools, lycées and boarding-schools, directors or managers of hospitals, hostels, etc.

All these persons should be obliged to follow a course of studies and obtain a certificate similar to that which, it is proposed, all staff engaged in teaching domestic science must in future possess.

If this common-sense step were taken, a reform in the more advanced teaching of dietetics would become all the more reasonable and necessary.

Italy.

COMMISSION FOR THE STUDY OF NUTRITIONAL PROBLEMS.

The most far-reaching and thorough investigation into nutrition is that made on the initiative of the National Research Council (a public institution serving as a supreme technical council of the State), which set up a special commission, instructed to study nutritional problems from both the experimental and social standpoints. His Excellency Filippo Bottazzi, Academician of Italy, Director of the Institute of Physiology in the University of Naples, is Chairman of the Commission.

This Commission, which set to work in 1927, first ascertained what progress had been made in Italy in nutritional studies and then outlined a plan for research into these developments with a view to remedying any deficiencies.

TESTING THE STANDARD OF NUTRITION BY THE PUBLIC AUTHORITIES.

This work, to which the Directorate-General of Public Health has contributed both directly and indirectly, was entrusted more especially to a number of other public and private bodies, in co-operation with one another and with the Central Statistical Institute and various local institutions. For the most part, it was carried out through the complicated network of political and corporative bodies which are concerned with the question of nutrition from the standpoint of either production or consumption.

Some signs or results of good or bad nutrition are brought out in statistics. Here, by means of its tables, the Central Statistical Institute supplies the authorities with proof either of the actual facts or of the extent to which the measures they have taken have been effective. Thus, the statistics show that both the general and special death rates for some of the diseases more particularly attributable to under-nourishment or malnutrition, such as pellagra or rickets, have fallen considerably, especially during the last twenty-five years. Similarly, the tables showing the expectation of death of children up to 5 years of age confirm that progress has been made in infant welfare, particularly in the matter of nutrition.

Several enquiries had been made since the constitution of the Kingdom of Italy into the standard of nutrition of the Italian people, but the methods employed were not giving reliable results. The Commission for the Study of Nutritional Problems, in co-operation with physiologists, hygienists and economists, therefore decided to undertake an extensive survey of the dietary of the different classes of the population in Italy by means of the family booklet method, which, despite the many criticisms levelled at it, is still the method most likely to produce satisfactory results.

1929 ENQUIRY.

The enquiry was made by professors of physiology in the university, who were able to obtain the help of their assistants and of some of the students in the Faculty of Medicine. Before the survey was begun, very thorough preparations were made and the political organisations of the regime (Federal Secretaries, Political Secretaries of the Fighting Fascisti), the economic syndical organisations (especially the confederations of industrial and agricultural workers and the Employers' Confederation), doctors and health officers, primary-school teachers and parish priests were invited to assist.

The enquiry lasted one month, from April to May 1929. During this time, the local representatives paid visits from time to time to the families to whom the booklets had been issued. For the rest, assistance was given and supervision exercised daily by the doctors and health officers, primary-school teachers and students of the Faculty of Medicine. In spite of these measures, about 50% of the booklets were not kept correctly and could not be used. The remainder, however, give a fairly accurate picture of the nutrition of the different classes in Italy in 1929. The data relating to this enquiry were published in the "Monographs on the Study of Nutritional Problems", a review issued by the National Research Council, the purpose of which is explained by its title. Owing to its wide circulation among competent persons, it is of valuable assistance in improving nutrition in the country.

ENQUIRY INTO BREAD-MAKING IN SARDINIA.

A specially important factor in Italian nutrition is the quality of the cereals from which bread is made. In order to obtain accurate information on this matter, the Commission for the Study of Nutritional Problems decided, in 1929, to make a special enquiry into the making of bread, and selected Sardinia as a field for research. The results showed of what cereals bread is usually made and what kinds of bread are most popular. It was also found that leguminous flour, chestnuts, etc., were sometimes added to cereal flour in making wheaten bread. The Commission thought it advisable to extend the Sardinian enquiry to the rest of the country. The information collected is being sifted and co-ordinated.

ENQUIRY IN THE PROVINCE OF LITTORIA.

The 1929 enquiry served the Commission for the Study of Nutritional Problems as a guide for future research. It has decided, as a result of the lessons learnt from this experiment, to make various changes in the family booklet hitherto in use. A new booklet has therefore been prepared for the enquiry into nutrition which will shortly be made in the Province of Littoria in order to ascertain the quantity and quality of the diet of the population which immigrated from various Italian provinces, and to follow the changes brought about in the dietary customs of each as a result of the influence of persons with different customs and of the special agricultural conditions of the area.

Since the object of this research is mainly biological, the enquiry into nutrition must be accompanied by an anthropological investigation if it is to be really useful. For this reason, the Commission intends to make an anthropographical survey of the whole population in the Province of Littoria. This investigation will be carried out by a special staff under Professor Sergio Sergi, Director of the Anthropological Institute of the University of Rome.

ENQUIRY AT RHODES AND ELSEWHERE.

In 1933, a special enquiry into nutrition was made throughout the Island of Rhodes by means of a special questionnaire relating to the kind of food generally consumed in the island. The results of this enquiry are being sifted and co-ordinated.

A nutritional and anthropological enquiry is being carried out in certain parts of Sardinia to ascertain in what way the physical characteristics of the inhabitants (height, constitution) have been influenced by dietary practices.

ENQUIRY FROM THE SOCIAL POINT OF VIEW.

While the investigations referred to above serve to ascertain the present standard of nutrition in order to raise it if necessary, economic and social surveys serve to show whether for some reason or other such conditions as are present are likely to prevent this standard from being maintained or raised. That is the object of the observations made by the Central Statistical Institute on the basis of the data supplied by the corporative and other bodies on the cost of living, price-levels and, consequently, the wage-curve.

In recent years (the last six years) real wages in industry have increased by 8.83%, while there has been very little change in agricultural wages.

Generally speaking, there has been a considerable improvement in the average standard of nutrition of town-dwellers, particularly workers, in recent years. This is because, under the corporative organisation, the working-classes can bring more influence to bear on the economic and social policy of the Government in fixing wages, controlling prices and adopting social measures.

Thus, the economic and financial policy of the regime has had considerable influence on the national food budgets, because the moderating influence brought to bear on prices, especially through the competent organs of the Fascist Party from 1929 to 1934, has helped to lower the cost of living. As a matter of fact, the national index numbers for the cost of living as a whole have fallen sharply, and the fall is even more pronounced if the national index of food prices is taken by itself.

National Index Number for the Cost of Living.

Year	General	Food
1929.	93.88	95.97
1930.	90.71	90.60
1931.	81.91	79.10
1932.	78.05	74.10
1933.	74.71	70.17
1934.	70.89	66.94

POPULAR INSTRUCTION.

The question of national nutrition is one of those which is engaging the closest attention of the Government. Side by side with the research and relief organisations' activities, an intensive campaign has been conducted to draw the attention of the public and of scientists to the importance of this problem, and to promote effective application of the measures suggested by experts.

In view of the national importance of the question, this campaign is not the task of a specific service, but is pursued in common by all the organisations of the State, the Fascist Party, the co-operative institutions and the competent special associations.

Close co-operation is being established between the bodies engaged in research and those engaged in practical action. The results achieved by the former, exerting their full influence through the executive orders given by the political authorities, are carried into effect by all—the central and subordinate organs of the co-operative system, the secretaries of the different trade unions, the relief institutions and the local authorities. The permanent framework on which propaganda must be based being thus available and its efficiency being assured, the public authorities can use it for all the steps it wishes to take, whether they are of a general or individual character.

Latvia.

TEACHING NUTRITION IN SCHOOLS.

Since 1928, two lessons a week are devoted to domestic science in the two upper classes of primary schools.¹ Until recently, the teaching thus given was defective and superficial, as specialised teachers, the necessary educational equipment (text-books and materials) and suitable premises were lacking. When the National Government came into power, radical changes were made. The Riga Municipality now sees that every school has a well-equipped kitchen and a special domestic science class-room. The Riga municipal budget allocates special funds for this purpose. Similarly, the necessary instructions have been given to the communal authorities to have primary schools in the country gradually fitted up, within three or four years, with the necessary household equipment (crochery, various household requirements, table and kitchen linen) costing about 100 to 150 lats. In future, it will be obligatory for every school-building scheme to include provision for a special kitchen.

Most (about three-fourths) of the domestic science course is devoted to teaching the utilisation and preparation of food, the rest of the time available being reserved for related subjects (care of the house, clothes, etc.).

At secondary schools, one domestic science lesson is given weekly, while at the institutions for the training of teachers the curriculum of the last two classes includes two domestic science lessons a week.

¹ The lessons are given to girl pupils only.

The Government arranges for the training of teachers specialised in domestic science. Thus, there is a provision that, in secondary schools, domestic science can be taught only by graduates of the Kaucminde School of Domestic Science. Special training-courses are organised for elementary-school teachers who have to give lessons in domestic science. One domestic science text-book has already been issued and is soon to be followed by several others.

Domestic science teaching in schools is based on the principle that food must be prepared *in a healthy and economic manner*. By means of a well-organised system of household training, the Government is endeavouring to improve public health and to prevent food wastage in homes. The Government realises the great importance, from the standpoint of public health and political economy, of disseminating the principles and practice of rational nutrition and has even considered increasing the number of lessons devoted to this subject.

Latvia has several special domestic science schools, which in 1934 had 302 children and twenty-one teachers. Domestic science teaching also plays an important part in the special Government schools of agriculture and domestic science. At the domestic science schools for girls, where the course covers one year and a half, the programme includes lessons in rational nutrition, preparation of meals, household accounts, utilisation of fruit, etc. The practical training comprises the equipment of a kitchen and the cooking of various foods, including pastries, and also the preservation of food products, serving meals, etc. The aims of domestic science schools may be epitomised by the following national saying, which forms the motto on the prospectus of one of the Government schools of domestic science :

“ Learn to keep house ! The hand of the farmer's wife can empty the barn faster than the farmer's cart can fill it.”

In Latvia, the senior domestic science school is that of Kaucminde, with a two years' course and about seventy pupils from 18 to 21, most of them belonging to farmers' families. During its twelve years' existence, this school has been attended by about 320 students and the annual number of graduates is now thirty-two.

Domestic Science Courses.

Outside the schools, domestic science training is at present given mainly by the Latvian Chamber of Agriculture, which has a special domestic science section. Before the Chamber was established in 1935, this work was done by the Latvian Central Agricultural Society. There are special societies for household supervision in country districts ; in 1934-35 they numbered twenty-one, with 443 rural households under their control. The Chamber of Agriculture has at its disposal thirty-five domestic science teachers, each of whom is responsible for supervising from fifteen to thirty households. The teachers visit these households and give advice, particularly on food products. They also give

courses and lectures at the request of rural organisations. In addition, the Chamber of Agriculture has fifteen travelling teachers, who confine themselves solely to organising training courses and lectures. This number is supplemented by five district teachers with similar duties. All these teachers are paid partly by the State and partly by private organisations.

Latterly, a new form of imparting a knowledge of domestic science has come into vogue—viz., the cookery competitions organised by the Riga domestic science schools.

The domestic science courses for women engaged in agriculture are usually devoted to special subjects—*e.g.*, the preparation of meat and vegetables, various handicrafts, weaving, dressmaking, household technology (dyeing, bleaching, furniture repairs, home decoration, etc.).

Domestic science is also taught to the “Young Farmers”, a very large organisation whose members are mainly recruited from young country people.

CAMPAIGN TO STIMULATE THE CONSUMPTION OF MILK.

With a view to giving farmers a bigger market in Latvia itself (the possibilities of selling abroad being very limited and the prices very low), the Ministry of Agriculture, the Central Dairy Society (the chief organisation for the export of and trade in butter) and various firms dealing in dairy products organised a “Milk Week” in the spring of 1935. A large number of posters and pamphlets were distributed explaining in a graphic way the great importance of milk and its by-products for public health. The pamphlets also contained various recipes for preparing milk dishes.

Similar propaganda was carried on at the same time through articles in the local Press and broadcast talks. The success of this propaganda week is proved by the following figures supplied by the twelve largest firms dealing in dairy products (including the Central Dairy Society already referred to) :

Dairy products sold	In October 1934			In October 1935		
	In schools	In State institutions	In municipal institutions	In schools	In State institutions	In municipal institutions
Milk, litres	30,403	45,549	3,505	46,609	80,194	5,038
Butter, kg.	2,101	9,645	—	2,986	29,792	—
Sour cream, kg.	1,992	666	—	2,682	7,328	—
Whipped cream, kg.	595	733	—	584	1,313	—
Curds, kg.	625	839	—	864	2,055	—
Buttermilk, litres	542	496	175	880	3,185	1,000
Kefir, bottles	97	651	—	181	1,464	—

It will be seen that the propaganda week led to a considerable rise in the consumption of dairy products in schools and the Government and municipal institutions. The same is true as regards the consumption of dairy products at home, although exact figures are lacking.

CAMPAIGN ON BEHALF OF SUGAR.

In Latvia, the production of and trade in sugar are a State monopoly. In order to increase the consumption of sugar and enable farmers to increase the acreage under sugar-beet, the Sugar Monopoly Department organised a huge campaign in 1935 on behalf of this product. Forty thousand copies of a 16-page pamphlet were distributed, giving a brief description of the important part played by sugar in public health as an article of mass consumption, and advice on its use in the household, and 300,000 copies of a special propaganda publication were distributed in country districts in order to acquaint farmers with the importance of sugar in nutrition. This publicity was followed up by Press articles and numerous lectures (some of them broadcast).

There are no exact figures showing the results of this sugar campaign. Shortly before it opened, the price of sugar was raised 5 centimes per kilogramme. It is true that, in 1935, the consumption of sugar fell by 2% as compared with 1934; but there is reason to suppose that, but for the campaign, the consumption would have fallen even more heavily as a result of the rise in price. In 1936, the consumption of sugar tends to remain steady, if not to increase. Moreover, the fall in sugar consumption in 1935 was also due to the fact that, as the fruit and berry crop was rather poor, substantially less was made into jam.

IMPROVEMENT IN THE QUALITY OF WHEATEN BREAD.

On August 25th, 1934, the National Government issued regulations concerning the quality of rye flour and bread. Flour mills, flour merchants and bakers are forbidden to mix rye flour with bran, lower-grade flour or any other substitutes. As a result, the quality of rye bread has improved, while the price remains the same, for compulsory provisions were issued at the same time fixing the retail price for rye bread at a maximum of 0.20 lat per kilogramme. The Ministry of Agriculture sees that these provisions are strictly observed.

Mexico.

The Government of the United States of Mexico has devoted constant attention to the question of improving the nutrition of the masses of the people by promoting the consumption of home-grown agricultural products. The Department of Public Health endeavours to spread among the public a knowledge of the principles and practice of rational nutrition.

It will be the object of the Federal District Service and of the service dealing with general questions as far as possible to induce the public by persuasion to follow more closely the rules of health in the matter of food and drink. Educational campaigns will accordingly be organised, as being preferable to the mere inspection of foodstuffs with a view to detecting infringements of the rules.

The Mexican Government has also striven to improve the living conditions of the working and rural classes, by enacting laws such as the Labour Law and the Minimum Wages Law, under which they are assured of higher wages and are thus able to obtain the necessities of life, and particularly foodstuffs, more easily.

NUTRITION RESEARCH INSTITUTE.

On January 10th, 1936, there was set up, under the Department of Public Health, a General Office of Nutritional Hygiene, including among its activities a Research Institute on Popular Nutrition, which, by studying existing data and the information collected in various parts of the country, will endeavour to ascertain the dietary habits, requirements and mode of life of the inhabitants and the sources from which they obtain their food and drink. It will propose changes with a view to improving nutrition by the fuller use of natural resources within the limits of the individual's means and will do its utmost to increase, as far as possible, the quality of local production.

It is proposed, through the Research Institute, to establish standard regional dietaries which would enable workmen and peasants, without spending more than they do at present, to obtain a better diet which would satisfy physiological requirements and lead to an improvement of the race and a better output.

Netherlands.

RESEARCH.

Consideration is being given to the expediency of setting up an Interministerial Commission, consisting of representatives of the various public services concerned with nutrition questions, the Ministry of Agriculture and Fisheries, the Ministry of Commerce, Industry and Shipping, the Ministry of Social Affairs, the Ministry of Education, Art and Science and the Board of Government Commissioners.

As complaints are heard from time to time of malnutrition among a section of the schoolchildren, especially those from social classes which are suffering from the economic depression, the Netherlands Government proposes to organise an enquiry throughout the country. A Commission of Experts has been appointed by the Ministry of Social Affairs to decide upon the method of conducting the enquiry.

Every other year, the Netherlands Pharmaceutical Society and the Netherlands Chemical Society organise a conference on the chemistry

of foodstuffs. The latest conference, which was held at Dordrecht in April 1936, discussed the nutrition of the Netherlands population, and had before it some important papers: "Nutritional Requirements" (by Professor B. C. P. Jansen); "Symptoms by which Under-nourishment and Malnutrition may be recognised" (by Professor L. K. Wolff); "Application of Statistical Methods to Enquiries into the State of Nutrition" (by Dr. J. H. van Zanten); "Examples of Home Feeding and Institutional Feeding".

POPULAR INSTRUCTION.

In the Netherlands, the campaign for the improvement of nutrition is conducted partly by the public authorities on grounds of hygiene and public health, and partly by the organisations for the marketing of agricultural and milk products with a view to encouraging the consumption of such products.

The campaign conducted by the Central Bureau for Public Sales of Vegetables and Fruits dates from 1924. It is conducted mainly by means of cookery-books, pamphlets by teachers in domestic economy schools and other specialists, which are distributed free by shops and at exhibitions. Demonstrations of cookery are given at various exhibitions for the benefit of the cause. The campaign also makes use of advertisements at exhibitions and fairs, advertising motor-cars and luminous advertisements, electric clocks, advertisements on paper bags, notices in newspapers, broadcast lectures and films.

The world depression has been the occasion of special propaganda efforts in connection with milk products. The consumption of milk products has hitherto been comparatively slight in the Netherlands, and the Crisis Bureau for Milk Products (Crisis-Zuivelbureau) has endeavoured to encourage consumption of these products in the home market. A special propaganda section has been formed, with thirteen propaganda centres, ten of which are in the provinces (one being for the provinces of Gelderland and Overijssel combined), and three for the cities of Amsterdam, The Hague and Rotterdam. The campaign is organised with the aid of various State and communal institutions, doctors, domestic economy experts and associations, public health services and the Press. An Advisory Committee for Scientific Research is in process of formation. The campaign is conducted by means of:

(a) Advertisements, wrappers, photographs, cookery demonstrations, circulars and pamphlets;

(b) The organisation of propaganda days or weeks for milk products, with preparation of the ground by means of posters, films, etc., and the organisation of stands at fairs;

(c) The distribution of milk products to mothers and wet-nurses, schoolchildren and unemployed in receipt of relief.

(d) In several provinces there were already provincial committees making propaganda to encourage the consumption of milk bread, before the propaganda centres were set up. In the Frisian Islands, for example, this propaganda had been very successful. Enquiries show that the percentage of milk bread to the total of bread consumed increased from 20% to 60%, and in some districts even to 70% and 80%. The provincial committees set up a large number of local committees. The Crisis-Zuivelbureau made use, wherever possible, of these existing organisations, on the principle that the parties concerned should pay for the propaganda. The provincial committees agree with this principle, and are at present co-operating with the propaganda centres of the Crisis-Zuivelbureau. The latter organisation has also approached the bakers' organisations and a co-operative organisation of consumers with a view to encouraging the consumption of milk bread.

EDUCATION.

Under the auspices of the Netherlands Ministry of Public Instruction and the Ministry of Social Affairs, committees have been set up to instruct housewives in the use of raw materials for food and the methods of preparing food in a nourishing and palatable form. In 1935, some 400 cookery courses were given in the country, and in the towns the population is given instruction by means of cookery demonstrations and pamphlets. A semi-official committee made two grants in 1935 of as much as 18,000 guilders for this purpose, and increased the amount in 1936 to 28,000 guilders.

Netherlands East Indies.

RESEARCH.

The public authorities in the Netherlands Indies are in a position to ascertain the prevailing level of nutrition. If certain groups of the population or certain districts are under-nourished, this fact is duly noted by the Local Government, the Public Health Service or the Department of Economic Affairs. There are Local Government officials, Government medical officers and agricultural experts in all parts of the archipelago, and their knowledge of the facts enables them to form a good idea of the sources of income, reserves of foodstuffs, commonest diseases, general living conditions, etc., of the population in their districts.

In 1933, all the unattached Government medical officers and the medical officers attached to the Local Governments were instructed to pay special attention to the level of nutrition in their districts. This enquiry was instituted in connection with the tenth Congress of the Far-Eastern Association of Tropical Medicine.

Special mention should also be made of the work of the " Instituut voor wetenschappelijk onderzoek der Volksvoeding en de met haar samenhangende problemen in Nederlandsch-Indië ", which was

established on September 21st, 1934, and receives a subsidy from the "Koningin Wilhelmina Jubileum Stichting". This institution promotes chemical, medical, economic and social researches in the field of nutrition. To this end it receives as much co-operation as possible; *inter alia*, from the Medical Laboratory and Advanced School of Medicine, the Central Leprosy Institute at Batavia, the Chemical Laboratory and the Department of Economic Affairs. At the present time, the "Instituut voor Volksvoeding", mentioned above, has instituted researches in Grissée, where the influence of nutrition on leprosy is being studied. Local investigations have shown that, on the whole, nutrition is adequate, but that a more rational diet could be obtained at the same price.

In 1929, Professor Donath compiled tables regarding the nutritive value of all kinds of foodstuffs, and, in particular, specifically native foodstuffs. These tables have been brought up to date at regular intervals between 1929 and 1935. They have been published in the *Medical Year-Book* for the Netherlands Indies and are in the hands of nearly all doctors. Thanks to the efforts of the institute for popular nutrition (Instituut voor Volksvoeding), new series of tables relating to the value of foodstuffs have been compiled, based on the researches of the chemical laboratory at Buitenzorg and the medical laboratory at Batavia.

Researches have recently been undertaken at the request of the "Koninklijke Paketvaart Maatschappij" to establish the vitamin content and the nutritive value of the rations issued to that company's native sailors.

POPULAR INSTRUCTION.

The medical and health propaganda service is endeavouring, by means of popular education, to ensure more rational nutrition—for instance, by displaying wholesome and hygienic foodstuffs at the fairs, in certain centres, etc. In the large towns, the communal and local public health services are co-operating in this work.

Poland.

RESEARCH.

The annual consumption per head of population of the principal articles of food in Poland is calculated on the basis of the country's total production and sales on the provision market. Certain facts are known regarding the consumption of the urban and rural populations; consumption has therefore been separately calculated for each voivodeship or group of voivodeships. Research is in progress regarding cereals, meat and potatoes, due regard being had to regional divisions.

Consumption statistics per head of population for 1934 were as follows :

	Kg.	
Potatoes	932	(highest figure in Europe)
Rye	159	(highest figure in Europe)
Wheat	51	(lowest figure in Europe)
Sugar	9.8	
Coffee	0.2	
Rice	1.4	
Meat	18.61	

An enquiry carried out in respect of four wage-groups showed that only a very small proportion of the budget of working-class families (four persons) is spent on food—viz.:

	Group Zloty per annum	Spent on food % of the total
(a)	1,527	66.1
(b)	2,386	60.1
(c)	3,230	54.9
(d)	4,995	44.6

The annual consumption of the chief articles of food (men) was :

	Bread Kg.	Potatoes Kg.	Milk Litres	Butter Kg.	Eggs Kg.	Meat Kg.	Fats Kg.	Sugar Kg.	Fruit Kg.
(a)	172.2	169.7	38.7	1.0	0.7	19.73	8.1	11.7	2.1
(b)	146.6	204.0	77.4	1.7	2.2	32.6	13.6	20.6	8.3
(c)	156.0	204.7	93.4	2.4	3.5	50.9	15.7	22.8	10.3
(d)	122.3	193.6	125.0	3.6	7.0	69.2	14.0	29.6	28.5

This very inadequate dietary is, nevertheless, luxurious compared with that of the unemployed.

EDUCATION.

The Polish Health Association has a food rationalisation section with a domestic economy institute. The object of this section is to make a scientific study of nutrition problems, and to disseminate a knowledge of these problems by means of lectures, exhibitions and publications (articles in the bi-monthly review *Public Health* and articles in the daily Press).

Propaganda on rational nutrition is carried on in towns and villages by various scientific and social institutions, which arrange courses on domestic economy, lectures, talks, etc.

Instruction on rational nutrition is given in schools of all types, and attention is drawn to the importance of health and to the nutritive value of the various foods in the growth of the human body.

Cooking and how to prepare food rationally are taught in the elementary schools for girls (Forms 6 and 7), when suitable premises are available.

The syllabuses of all vocational schools for girls include a yearly domestic course, dealing extensively with the problem of rational family nutrition. There are 108 special domestic schools of three kinds—primary, secondary and higher—in which nutrition problems are treated fully.

Roumania.

RESEARCH.

Among investigations of nutritional diseases may be mentioned the work undertaken at Osoi in the model village of Tomesti, which formed part of the activities of the Institute of Health at Iassi. The study was concerned with nutrition in the commune of Osoi, where it was found that maize formed an important element of food. It was observed, also, that there was little meat or protective food such as milk and vegetables.

EDUCATION AND POPULAR INSTRUCTION.

Education and propaganda are carried on in the child welfare dispensaries, where mothers receive advice on infant feeding, and this is supplemented by the visiting nurses. There are schools of housekeeping where teachers are trained, and courses on housekeeping in the professional and higher schools where children learn the preparation of food and to distinguish good from poor quality. They are also taught the nutrition value of different foods.

There is a National Milk Committee affiliated with the International Milk Federation. This committee takes all possible steps to stimulate the production and improvement of this important food as well as milk publicity.

Siam.

POPULAR INSTRUCTION.

Public health education is important as a means of improving the standard of nutrition. To achieve this object, the Department of Public Health has distributed pamphlets, leaflets and posters to schools and has also given advice through the public health nurses to mothers in regard to suitable feeding for themselves and their children. Furthermore, the display of public health motion-pictures dealing with nutrition is being contemplated with a view to raising the standard of national nutrition. The Siamese Red Cross Society is also carrying out general health propaganda for improving nutrition.

Sweden.

RESEARCH IN MATTERS OF NUTRITION.

An extensive social-hygienic investigation was carried out in the provinces of Västerbotten and Norrbotten during the years 1929-1931, at the instigation of the former head of the Medical Board, Director-General Nils Hellström.

The chief aim of this investigation was to discover the relation between the deficiency in the diet existing in these provinces and certain conditions of ill-health, mainly the reduction in certain functions of the stomach (achylia), colitis and anæmia, which appeared to be more prevalent in those districts. The result of this very extensive investigation has so far been published only in Swedish. A translation into English is in preparation. A large number of special investigations on a more restricted clientele have been carried out by private practitioners—as, for instance, the late M. C. A. H. Ljunggren, M.D.

In the account of an investigation published in the year 1933 concerning the influence of dietetic and hygienic conditions on the health of forest labourers, the Social Board and the Medical Board have put forward certain suggestions for the improvement of the preparation of food for forest labourers and lumber-floaters during their stay in the forests. A thorough analysis was made of the diet and the health conditions of these workmen. The investigation resulted in a recommendation that educational propaganda should be inaugurated—and directed, not only towards the workers, but their employers—that a handbook should be compiled on the organisation and upkeep of common camp-kitchens for forest labourers, and that short courses of instruction should be arranged for persons wishing to take employment as housekeepers or cooks in lumber-camps.

The chief sources of information as to the composition of the Swedish diet are the household investigations carried out by the Social Board. These are : “The Cost of Living in Sweden, 1913-1914” ; “The Consumption of Foodstuffs in Households of People of Small Means during the Years 1914 and 1916” ; “The Consumption of Foodstuffs in the Households of People of Small Means during the Years 1914-1918” ; “The Cost of Living in the Rural Areas of Sweden in the Year 1920” ; “The Cost of Living in the Cities and Industrial Centres about the Year 1923” ; “Living Conditions and Household Habits in the Cities and the Industrial Centres about the Year 1932” ; “Living Conditions and Household Habits of Workers in the Rural Districts about the Year 1933” . These investigations, which form a part of the Official Statistics of Sweden, contain a summary in French. It is intended to make such investigations every ten years.

The household investigations referred to are carried out in the following manner : To a large number of families—usually over a thousand—very detailed housekeeping books are supplied, which are to

be kept during a whole year. In the preparation of the material thus obtained, knowledge is gained as to the distribution of the expenditure on the different items, and, as regards foodstuffs, the quantities purchased of the different kinds. The composition of the diet can then be considered with reference to the size of the family, degree of prosperity, the occupation of the head of the family, etc.

The investigations mainly concern households of the working-classes and the lower grades of the public service. A first examination of this material from the point of view of the physiology of nutrition has been carried out by the Social Board. A more thorough analysis is at present in preparation.

EDUCATION.

Government action in this sphere includes the training of female teachers for school-kitchens who are charged—especially in the primary and middle-stage schools—with the teaching of kindred subjects. A special volume of about 100 pages entitled “Norrlandskvinnornas hjälpreda” (The Norrland Housekeeper’s Guide) has been very widely distributed in the homes, mainly through the intermediary of the Governors’ offices, in the north of Sweden. This volume is chiefly intended for the homes in the rural districts of the north, but its contents are also of use beyond the borders of the provinces for which it was compiled. Broadcasting instruction is also given on these matters, partly by lectures, serial or individual.

POPULAR INSTRUCTION.

In addition to its other humanitarian activities, the Swedish Red Cross has made propaganda for better diet by arranging exhibitions and publishing pamphlets. One of these pamphlets, entitled “Vår föda och folkhälsan” (Our Food and the Public Health) has been distributed in the municipalities on the northern border, thanks to Government subsidy and through the intermediary of the Board of Education. Many other organisations undertake similar activities. The Taxpayers’ Association (which is advocating sound expenditure of private as well as public money) has published several pamphlets and short articles dealing with a diet properly composed from the point of view of nutrition. The Co-operative Federation undertakes propaganda in the same direction in its paper *The Consumers’ Gazette* (circulation 500,000 copies), by publishing books on the subject, by arranging study circles, by the so-called Women’s Guild Movement, and by “housekeepers’ evenings” arranged by the co-operative societies, at which demonstrations are arranged to show the proper preparation of food. A large number of associations for housekeepers and other similar societies, as well as the people’s educational movement in general, include dietetic courses in their programmes. Finally, propaganda is made by private persons—as, for instance, medical men,

Switzerland.

POPULAR INSTRUCTION.

In Switzerland, the growing of dessert fruits is warmly encouraged. The Federal Alcohol Régie gives subsidies for the improvement of orchards. Fruit-picking, for marketing in the towns, is organised in certain cantons with the assistance of the public authorities—for example, in the Valais.

Several forms of propaganda for the consumption of food products of Swiss origin are educational in character and aim at promoting the economic interests of producers. The organisations devoting special attention to the problem of rational nutrition include :

- The Swiss Hygienic Society, with headquarters at Basle ;
- The Swiss Hygienic Alliance, with headquarters at Basle ;
- The Swiss Milk Commission ;
- The Bread Conference ;
- The “ Cartel romand d’Hygiène sociale et morale ”, with headquarters at Lausanne.

Under the auspices of the Health Committee of the “ Cartel romand d’Hygiène sociale et morale ”, propaganda is at present being carried on to encourage the consumption of milk, dairy products, non-fermented fruit-juice and wholemeal bread.

A Bread Commission of hygienists, chemists and representatives of the milling and baking industries under the direction of the Federal Public Health Department has been constituted with a view to finding a formula for a “ People’s bread ”. The idea is to make more rational use than is the case at present in the majority of breads in current consumption, and white bread in particular, of the constituent elements of the grain, so as to supply the human body with those parts which are necessary for the maintenance of its efficiency, and above all, certain vitamins found mainly in the husks and bran. The bread-type problem is closely connected with the problem of dental decay, the frequency of which in Switzerland seems to be due, in part at any rate, to defects of nutrition.

Reference should be made in this connection to the vigorous propaganda carried on in certain parts of Switzerland in favour of the consumption of raw foods. As raw foods retain their vitamins intact, whereas cooking destroys or alters them, their influence on certain diseased conditions may be excellent, and rational publicity in this direction is able to render real services.

Active propaganda is being carried on in the matter of dairy products, in order to advertise their nutritive qualities. The Swiss Propaganda Office at Berne, the Swiss Milk Committee, the Swiss Commercial Expansion Centres at Zurich and Lausanne take an active part in this propaganda.

EDUCATION.

In Switzerland, instruction in domestic economy is highly developed, but, as in the majority of countries much, still remains to be done. As a general rule, indeed, the education of girls scarcely ever concerns itself with the essential tasks of the mistress of a house. Not only does it neglect domestic economy, but economy of every kind. Instruction in domestic economy teaches girls to examine and choose foodstuffs, to prepare meals and manage their houses as economically as possible. They acquire habits of cleanliness and good taste, so that they are subsequently able to make their homes attractive, and, in addition, they receive valuable instruction in hygiene and the care of infants. The courses are also designed to counteract certain prejudices which are deep-rooted in many parts of the country.

Turkey.

To establish standardised nutrition in a country like Turkey, where customs and climatic conditions vary greatly, is a complex problem which it is practically impossible to solve. Enquiries have naturally been made into the method of nutrition of the various classes of the population. The results have merely served to confirm the particulars already known. The question of nutrition in the towns was placed on the agenda of the fourth National Congress of Medicine held at Ankara in September 1931, and was the subject of long discussion.

POPULAR INSTRUCTION.

The public authorities and private organisations have not found it necessary to undertake propaganda regarding the general principles and conditions of nutrition.

In accordance with the provisions of the Public Health Law, health teaching is compulsory in all the educational establishments. Apart from such instruction and some broadcast lectures, we have not yet established any organisation for encouraging the habits of rational nutrition among the masses.

United States of America.

MEASURES FOR THE IMPROVEMENT OF NUTRITION UNDERTAKEN BY THE PUBLIC HEALTH SERVICE.

The nutrition work of the United States Public Health Service (U.S. Treasury Department) has been confined almost entirely to research work. This is being carried on along two different lines :

I. *The Office of Nutrition Investigations*, which conducts experimental laboratory studies on various nutritional problems.—In the past, the work of this office has consisted mostly of studies on pellagra, since

the control of this disease is an important problem in the United States. In addition to laboratory research, this office has held clinics, presented papers on pellagra to medical societies, and prepared exhibits for the dissemination of the new information acquired about this disease.

II. *The Office of Field Investigations of Child Hygiene* has made extensive field studies on large groups of children. The latest study now in progress includes details of nutritional status and correlates physicians' examinations, incidence of illness, with growth in height and weight and nutrition estimates on a group of about 5,000 school-children. This office, in co-operation with agencies in various States, undertakes investigations of growth, nutrition and health status of children in different areas of the United States. The results of some of the more recent of these studies indicate that, in a selected small city, the average weight of children in the years 1921-1927, as compared with May 1933, presents no consistent or statistically significant differences. Classification of children in three groups ((a) those from families of the unemployed, (b) those from families part-time employed and (c) those from families of the regularly employed) shows approximately the same differences in the weight of children as generally found in different socio-economic classes. It is concluded, therefore, that there has been no obliteration nor widening of class differences during the period of the depression.

A study of the relative change in height and weight during 1929-1933 of urban children from (1) families that remained in comfortable economic circumstances during the entire period, (2) families that remained poor and (3) families comfortable in 1929 but poor in 1933 shows that young children from families that had become poor failed by approximately 2% to attain the weight of the children of the group as a whole. The conclusion is drawn, so far as growth in weight of this sample of children from urban wage-earning families is concerned, that it is children from families whose incomes have fallen to a low level who have been affected by the economic depression.

A study of the diets of low-income families surveyed in 1933 in nine scattered localities in the United States, based on records of a week's food supply, indicates an average energy value of the food supply nearly 20% below the adequate standard of 3,000 calories per day per adult male unit for families in five cities with a weekly income of less than \$2 per person, and about one-fourth of these families had less than 2,200 calories daily. The calorie supply was similarly low for families in New York City with incomes less than \$4 weekly per person. Relief families, except those on work relief in New York City, had a higher average supply of calories than the poorest non-relief groups, but 25% in the five cities and 29% in New York had less than 2,200 calories per adult male unit. The average caloric value of the food supply of families at the lowest income levels in the other three communities equalled or exceeded the adequate standard, owing to the general use of large quantities of fat meat, flour or other cereal foods and sugar.

A greatly diminished use of milk, vegetables and fruits was associated with lower incomes in all the communities in the study. In the five cities, the average supply of milk purchased by families with income less than \$2 *per capita* per week was one-third less than minimum requirements, and average amounts of fresh and canned vegetables and fruits were about equal to minimum needs. Bread and cereals were also used in smaller amounts than is recommended for a low-cost diet. On the other hand, amounts of meat and fish, eggs and sugary foods purchased, though less than amounts purchased by higher-income families, exceeded the quantities recommended for an adequate low-cost diet. The result was a dietary low in calcium and vitamins.

In New York City, the average dietary of the lowest-income families included adequate quantities of fresh and canned vegetables and minimum amounts of milk. However, the period of canvass in New York City extended later into the spring season than did that in the five cities. In these families which had a food supply with less caloric value than the minimum need, the use of such cheap high-caloric foods as bread and cereals, dried legumes and potatoes was less than is recommended for a low-cost diet.

The families in the mining towns of West Virginia and the cotton-mill villages of South Carolina whose weekly income was less than \$2 per person purchased less than half the requirements for milk in a restricted diet and also used too little fruit. The average amount of fresh and canned vegetables reported by families in the mining towns was below minimum requirements, and that for mill-village families approximately equalled the minimum requirements.

In Birmingham, the food supply of the lowest-income families was deficient chiefly in milk.

The United States Public Health Service furnishes medical service for the Office of Indian Affairs of the Department of the Interior, and this office is attempting to improve the nutrition of the American Indian. Efforts are being made to give Indian children in boarding-schools and in day-schools a balanced ration in conformity with budgetary allotments. It has been observed that the Indian children in boarding-schools gain in weight and are physically much better after a sojourn in the school than at the time of arrival. It is believed that the boarding-school diets are largely responsible. The same thing is true of day-school pupils to whom hot lunches are furnished. Hot lunches are common throughout the Indian day-schools. The field personnel, as a part of the regular public health programme, stress the importance of nutrition and proper diet through their health educational work and the extension division is teaching Indian pupils to can and preserve foods, which is regarded as an important phase of the question and is being carried out on a large scale.

The problem of the Indian boarding-school is to provide food for optimal nutrition at a moderate cost. Usually adequate nutrition will be indicated by the normal growth of the children in weight and height,

the best index of good health and good nutrition during childhood. The fact that the Indian boarding-school feeds the children only ten months out of twelve must be considered when planning the diet. Many of the children report to school in poor physical condition. Cases of malnutrition are not unusual; because too great a change in diet may cause illness when the children first come to school, they must be watched carefully during the period of adjustment and new foods added to the diet gradually. On the other hand, new foods may not be readily accepted by the children, and much educational work is necessary in carrying out the nutritional programme.

The Indian day-school has another problem, because, in the day-school, children have only the noon meal five times a week. Even greater care, therefore, must be taken in planning this meal, because the meals provided at home are often inadequate for growing children. The meals eaten at school must supply growth and protective foods to supplement the home diet, and should not be a repetition of foods eaten at home, even though the children may not accept new foods at once.

ENQUIRIES INTO FAMILY EXPENDITURE ON FOOD.

For more than forty years, the Department of Agriculture has concerned itself with the content, cost and nutritional adequacy of American diets. Information on family food expenditures and on food consumption patterns has also been collected by the Bureau of Labour Statistics and other public and private agencies. However, many of the studies made in the past are not useful in making a complete summary of food consumption, because the data have not been published in sufficient detail.

Estimates of consumption based on ten studies made during the period 1913-1933 have been analysed by Dr. Hazel K. Stiebeling, of the Bureau of Home Economics, and the results have been compared with a detailed analysis of seventy-three selected winter dietary records collected in 1934-35 in cities of the North Atlantic region. The latter are a part of a current nation-wide study of the disbursements of wage-earners and salaried workers, being conducted by the United States Bureau of Labor Statistics.

As part of its 1934-1936 investigation of the disbursements of families of wage-earners and low-salaried workers, the Cost of Living Division of the United States Bureau of Labor Statistics is collecting supervised weekly records of family food purchases. These records are being made at each season of the year in many cities scattered over the country. The primary purpose of the study is to secure data basic to the construction of satisfactory seasonal indexes of food costs. In order to make the data useful also for evaluating the economy and nutritional adequacy of the diets, the data include, in addition to records of food purchases, inventories of the food on hand at the beginning and end of the week, records of edible and non-edible waste, and information

regarding some of the factors affecting food habits and needs, such as income, food-buying procedures, occupation, as well as the number, age, sex, weight and height of persons consuming the food.

It is found that, with increasing *per capita* expenditures for food, the families studied in 1934-35 tend to buy more food, and more expensive food. The increases in the quantities purchased were most pronounced in the case of milk, meats, eggs, fruits and vegetables (other than potatoes and dried legumes). At the three expenditure levels studied in detail, about the same average prices were paid for milk, eggs, potatoes and dried legumes; but at the higher expenditure levels more expensive forms, as well as larger quantities, were purchased of other vegetables, fruits, meats, fats, sweets and grain products.

The winter diets of wage-earner's families in the North Atlantic region were relatively lower in grain products, eggs and the succulent fruits and vegetables, according to a study made in 1935-36, than are the estimates of year-round consumption based on studies made during 1913-1933. More potatoes, dried legumes, citrus fruit and meat, poultry and fish were included in winter diets; this might be expected, since these foods are usually cheaper in the winter than at other seasons. The consumption of milk, fats and sugars is quite comparable in the two sets of figures.

The nutritive value of the winter diets of North Atlantic wage-earners improved as expenditures for food increased. The more expensive diets had the higher vitamin and mineral values. But, if at each expenditure level the food was eaten in the proportions reported and in quantities just sufficient to satisfy energy requirements, the quality of the diets at the two lower expenditure levels would leave much to be desired. They would be comparatively low in minerals and vitamins, especially in calcium, and vitamins B and C, as judged by present knowledge of nutritional needs. Diets can be reinforced in these factors by careful food selection. To do so without adding to food expenses requires a knowledge of food values in relation to food prices.

NUTRITION OF CHILDREN.

In order to combat the effects of the economic depression on the health and welfare of children, the Secretary of Labour, in October 1933, convened a Child Health Recovery Conference. As a result of this conference, the Children's Bureau of the United States Department of Labour prepared a physical examination record blank, together with instructions for its use, which many communities used in their attempts to locate under-nourished children.

For more than two years the Children's Bureau has been accumulating from many sources evidence of various kinds—some statistical, some reports of small groups of cases, some opinions of individuals—tending to show that the depression is having a very real and increasingly severe effect on the health and nutrition of children.

It is, of course, obvious that the figures from one community are not necessarily applicable to another, and because the effects of privation are demonstrable in one region it does not necessarily mean that they exist in another. But the sum of the evidence at hand points to the fact that the nutritional condition of children in many communities is showing increasingly serious effects of the long periods of unemployment and want. Striking corroboration of this was given at the recent conference of State and provincial health officers of North America when replies to a questionnaire sent out by its child-hygiene committee were reported. These showed that twenty-two of thirty-nine State health officers considered the nutritional needs of children as the needs outstanding above all others.

A report issued in July 1933 gives the following indications as to the nutrition of children of school and pre-school age :

“ Reports of malnutrition among children of school age have come from a number of cities. The figures from New York City, as given in the *Weekly Bulletin* of the Department of Health for November 26th, 1932, supplemented by a personal communication from the city health commissioner, show an increase in malnutrition among schoolchildren in the Borough of Manhattan from 16% in 1929 to 29% in 1932, and an increase in the Borough of the Bronx from 13 to 23% during the same period.”

In other words, the proportion of schoolchildren in these districts of New York City who showed malnutrition at the end of 1932 was nearly twice as high as the proportion four years before. More than 300,000 New York City children were examined each year. The percentage of malnutrition found in each of six consecutive years is shown in the following table :

	1927	1928	1929	1930	1931	1932
New York City .	13.5	13.6	13.4	16.1	17.0	21.1

Another example from the Community Health Centre of Philadelphia, where children coming under the care of certain Jewish welfare organisations are given careful physical examination, shows that, in this group, malnutrition has increased among children of school age (6 to 16 years) from an average of 30% of those examined from 1928 to 1930 to 42% of those examined in 1932.

Information with regard to the condition of pre-school children is no more encouraging. In New York City, the East Harlem Nursing and Health Service has reported that steady improvement in the nutrition of pre-school children attending its clinics took place from 1923 until 1931, at which time only about 13% of those examined were found to be under-nourished. During 1932, however, the amount of malnutrition doubled, and 24% of the children examined showed the effects of poor nutrition. The work has been under the direction of the same pediatricians since 1923.

In Philadelphia, among children under 6 years of age examined at the Community Health Centre, the percentage of malnourished children shows a definite rise—from 11% in the period 1928 to 1930 to 24% in 1932. In this age-group, there is an increase of more than 100% in the amount of malnutrition.

From even the fragmentary information available, it is probably quite safe to estimate that to-day somewhere in the neighbourhood of one-fifth of all pre-school and school children in the United States are showing the effects of poor nutrition, of inadequate housing, of lack of medical care, and, in many cases, the effect of the anxiety and the sense of insecurity that prevails wherever there is no work. In some regions, without question, the proportion of below-par children is far greater than this, reaching truly appalling figures; in others, where conditions have been more favourable or where the effects of unemployment have been more satisfactorily mitigated through relief measures, the proportion is possibly lower.

At the present time, the Children's Bureau is conducting a study of the physical fitness of schoolchildren in New Haven, Connecticut. Its purpose is to attempt to compare and evaluate the various methods of estimating the physical fitness and nutritional condition of schoolchildren now in use by school physicians, nurses and teachers, or recommended for such use.

EDUCATION IN NUTRITION.

Public authorities have assumed major responsibility for an educational programme in nutrition. The Extension Service has a nutrition programme in every State, co-ordinated by a nutrition specialist from Washington working through the nutrition specialists in the States, and extended down into more than 1,350 counties through the home demonstration agents.

Nutrition is taught in the schools in a so-called "integrated" home economics programme in the lower grades and directly in junior and senior high schools. In many States, classes for mothers are an important form of adult education.

The Foods and Nutrition Division of the Bureau of Home Economics, and the home economics divisions of many State experimental stations and private institutions have conducted studies in human nutrition. The results of these studies have contributed largely to the development of educational programmes in wise food choice.

The American Red Cross has for many years had a nutrition programme. Under this agency, educational work in nutrition in different areas has been stimulated, and in some cases local chapters have made available nutrition workers for the local community. The American Child Health Association has stimulated both research and educational work in the field of child hygiene.

The Millbank Foundation and the Association for improving the Condition of the Poor in New York, the Elisabeth McCormick Memorial Fund in Chicago, and the Heller Foundation in California are examples of local foundations that have done both research and educational work in nutrition and have worked very closely with Governmental agencies.

POPULAR INSTRUCTION.

The Bureau of Home Economics of the Department of Agriculture publishes, not only technical bulletins reporting results of nutrition and diet studies, but popular bulletins which may be used directly or in modified form by individuals or organisations for educational work. Many of the States and private organisations prepare their own bulletins. In addition to the printed publications, a weekly news release known as *The Market Basket* is distributed to a number of newspapers in the various States. Radio talks are prepared and distributed to be broadcast from local stations, and a talk on nutrition is given weekly over a national network. Charts and film-strips are available for educational work.

The Children's Bureau has, since its establishment, distributed literature containing information as to the planning of adequate diets and the value of certain foods for pregnant women and for children. These publications include bulletins in which certain sections deal with diet during pregnancy, and with the feeding of the infant and child, as well as special pamphlets on milk and other foods and on nutrition. Large numbers of these publications have been distributed : " Prenatal Care ", 3,769,969 ; " Infant Care ", 8,478,780 ; " Child Care and the Child from 1 to 6 ", 3,114,619 ; " What is Malnutrition ? " 70,000 ; " Milk, the Indispensable Food for Children ", 31,000 ; " Why drink Milk ? " 365,000.

Other leaflets outlining adequate family food budgets have been prepared in co-operation with the Bureau of Home Economics of the United States Department of Agriculture. These leaflets deal with " Emergency Food Relief and Child Health ", " How to spend your Food Money ", " Family Food Budgets for the Use of Relief Agencies ". They are used chiefly by relief agencies and other social agencies working with children. A " Programme for an Undernourished Child, 2 to 16 Years of Age ", of which approximately 700,000 copies have been distributed, may be quoted by way of illustration :

" Programme for an Under-nourished Child, 2 to 16 Years of Age.

" The diet *must* include the following protective foods :

" *Milk.* — One quart of whole milk daily, either fresh or prepared by diluting evaporated or dried milk. To this *may* be added other

milk products, such as dried skim milk, cream and cheese. *Milk is indispensable in the child's diet.*

“ *Butter.* — On bread or other foods.

“ *Egg.* — One daily.

“ *Vegetables.* — At least one serving daily of a green leafy vegetable and one serving of some other coloured vegetable : spinach, turnip-tops, beet-tops, cabbage, kale, chard ; carrots, green beans, peas, beets, tomatoes (fresh or canned, squash).

“ Many vegetables may be used raw, such as cabbage, carrots (grated), lettuce, celery, watercress, tomatoes. Other vegetables, such as turnips, onions, parsnips, cauliflower, may be used, but not to the exclusion of green leafy or other coloured vegetables.

“ *Fruit.* — At least one serving daily of a fresh fruit. Oranges, bananas, apples, or other fresh fruit in season. Cooked dried fruits, such as raisins, prunes, apricots and peaches, are valuable foods and should be used frequently in addition to fresh fruits. Other cooked fruits may be given.

“ *Cod-liver oil.* — Two to four teaspoonfuls daily, especially in the north temperate zone.

“ In addition, *other energy and body-building foods :*

“ *Bread.* — Two or three times a day ; whole-grain bread at least once a day.

“ *Cereals.* — Hot cooked cereal once or twice a day, served with milk or cream.

“ *Starchy vegetables.* — Potatoes, sweet-potatoes, rice, barley, macaroni or hominy once a day.

“ *Meat or fish.* — Fresh lean meat or fish once a day, if possible.”

“ The foods recommended for under-nourished children are the same for any age group ; but the older child, especially the child in his teens, needs larger quantities of each food than does the younger child. Under-nourished children of all ages should have a quart of milk ; children in their teens may drink more.”

AMERICAN NATIONAL RED CROSS ORGANISED ACTIVITIES IN NUTRITION.

In an effort to improve existing health conditions, to combat malnutrition, and to safeguard the physical welfare of the family, Red Cross Chapters conduct organised activities in nutrition. A Nutrition Consultant is maintained at national headquarters to whom Chapters may refer problems relating to these activities.

Nutrition Activities.

(a) Programmes in nutrition utilising the services of a well qualified nutritionist on a full-time or part-time paid basis are conducted as a part of a general health programme in a community. The type of nutrition work developed depends upon the health and nutritional needs of the community and Chapter funds.

(b) Food and nutrition classes are offered as short-time low-cost projects with an instructor authorised by national headquarters serving on a volunteer or paid basis. The instructor must be a graduate from an accredited school in home economics with satisfactory teaching experience. These classes provide practical instruction on adequate diets at minimum and moderate costs, the wise spending of food dollars, meal planning and the proper methods of preparing foods.

Nutrition in the Service Programmes of Red Cross Chapters.

Assistance is given by the Nutrition Consultant to public health nurses and home hygiene and care of the sick instructors, home service and civilian home service secretaries on effective ways of applying nutrition which will enable them to render a broader social and health service to their families.

Local home economists in Red Cross Chapters are invited to serve on such Chapter Committees as Nutrition, Disaster Preparedness, Home Service, Civilian Home Service and Canteen in an effort to further safeguard the health and nutrition of the families for whom the Chapter has assumed responsibility.

Uruguay.

The services of the Ministry of Health which deal with the problem of nutrition are the Department of Nutrition and Dietetics and the National Commission for Rational Nutrition.

DEPARTMENT OF NUTRITION AND DIETETICS.

Created in 1934, this Department is responsible for the organisation of rational nutrition throughout the ramifications of the Ministry's work, for establishing a national nutrition index based on data regarding various groups, classes and communities.

In the current year, the Department has reorganised the dietaries of the hospital services of the Public Health Department. In the first place, it laid down health rules for staff handling foodstuffs, for meal-times and for the standardisation of diets so as to harmonise the dietetic prescriptions with the practical resources of the kitchens and their staff. The good results of this work have already been noted at the Pasteur Hospital.

The Department is at present organising an enquiry to determine the nutrition coefficient of the country. For this purpose, it is preparing a family nutrition record card to be filled in with particulars as to total monthly income, the number of members of the family, and giving detailed daily menus.

The enquiry will, as the preliminary step, be confined to the capital ; the cards will be distributed to various official and private institutions having a large staff which will be instructed how to fill them in. Thus, in a short time, documentary material will be collected relating to at least 5% of the population of the capital.

The Department is also continuing the dietetic reorganisation begun at the Pasteur Hospital. When this has been terminated, all the hospital services of the Public Health Department will benefit by the results.

The Department is also preparing a publication on " Foodstuffs and Nutrition " which will be used as a textbook for the courses in nutrition and dietetics at the School of Social Service. This publication will be widely circulated and will thus assist the popular educational work undertaken by the Commission for Rational Nutrition.

NATIONAL COMMISSION FOR RATIONAL NUTRITION.

This organisation, which plays an active part in spreading knowledge of nutrition, has been attached to the Ministry of Public Health. From April 1935, it has been in command of funds to enable it to carry out an extensive scheme covering various aspects of the problem of popular nutrition.

The Commission consists of an executive sub-committee, and an advisory sub-committee composed of experts in nutrition, national economy, agriculture, banking, etc., whose opinion is sought whenever any problem arises that comes within its technical competence.

The Commission has included the following points in its programme of action for the immediate future :

(a) Continuation of popular education in the principles of rational nutrition ;

(b) Effective participation of the Ministry of Public Health in the control of milk and in the organisation of similar services prescribed in the organic law concerning the inspection of foodstuffs.

RESEARCH WORK.

In the domain of science, there has been established in the Ministry of Health a Laboratory for biological research in matters of nutrition ; in this Laboratory, which is attached to the Commission on Rational Nutrition, the scientists of the country continue their fundamental and permanent work of determining the composition and nutrient value

of national products, the knowledge of which is becoming gradually more complete, and also carry out researches to serve as the basis of technical improvements for the benefit of the whole community. The Laboratory has already published data connected with experiments concerning "Poisonous Varieties of Mushrooms in Uruguay", the "Influence of Vitamin A on the Growth of the Fur of White Rats", the "Action of Diphtheria Toxin on Vitamin C of the Tissues", "Hypervitaminosis A", the "Pathology of Equine Scurvy", the "Vitamin C Content of Foodstuffs in Uruguay", "Vitamin C in the Diet of Infants".

It is intended to publish during the year a first series of results obtained in connection with the "Chemical Composition of Foodstuffs". The Laboratory will continue its research work in the various branches of experimental dietetics, in particular "Vitamins", "Avitaminosis", "Fluorosis", the "PH of the Soil and Vegetable Growth", the "Nutrient Value of Cereals and Native Vegetables", etc. The plan to attach an experimental kitchen to the Laboratory as an important adjunct to dietetical research will also be carried out this year. At present, consideration is being given to the possibility of using the technical services of the Agronomic Section of the Ministry of Public Health with a view to improving equipment and alimentary products in public health establishments.

EDUCATION.

Educational propaganda has been conducted with a view to inculcating into the population definite ideas on a properly balanced dietary and the necessity for consuming, in addition to protein foods, such as meat—of which the country has ample supplies—also vegetables, fruits, etc. The propaganda pamphlets issued by the Commission for Rational Nutrition and the important nutrition exhibitions and various series of lectures which are broadcast every year throughout the country are of importance in this connection.

In 1935, the Official Broadcasting Service organised two series of lectures on modern problems connected with the nutrition of infants and schoolchildren, the rôle played by fruits and vegetables in human nutrition, the pasteurising and hygienic preservation of milk, nutrition and physical development, etc.

In educational circles, future schoolmistresses are required under the regulations to follow a course of domestic economy, which includes theoretical and practical lessons on the composition of foodstuffs and their preparation; these courses are given by trained teachers. Lessons on the preparation and food value of a standard bill of fare are also included in the curriculum of a number of private schools.

The School of Rational and Economic Dietetics gives mothers theoretical and practical training in the preparation of foodstuffs and their composition at the milk dispensaries in various parts of the capital;

this training is in the charge of a specialised woman dietician. Similar courses, with the same educational objects, are also given by the Uruguayan Red Cross and a number of private institutions.

In 1936, at the School of Social Service, a course on nutrition and dietetics for nurses was begun. In the first year, lectures will be given concerning the composition and properties of foodstuffs and the general preparation of dietaries; in the second year, the students will study special dietetics. This course is accompanied by numerous practical demonstrations and the lectures are given by the technical members of the Commission on Nutrition.

POPULAR INSTRUCTION.

Propaganda campaigns have been organised to encourage the consumption of Uruguayan fruit and honey.

The third "People's Nutrition Exhibition" is being prepared. This exhibition, as in previous years, will be a demonstration of the country's resources in the production of natural and prepared foodstuffs, and will also provide an excellent opportunity for disseminating the essential principles of rational nutrition.

Yugoslavia.

RESEARCH.

There is a special State organisation in Yugoslavia in connection with public health which covers all questions of hygiene and medico-social problems. The public health institutes and institutions are engaged on a thorough study of all these questions.

Statistical material with regard to nutrition is assembled by the Central Health Institute at Belgrade, the Public Health School at Zagreb and other public health institutions. The material is derived from direct enquiries by special experts regularly visiting the homes of the rural population, or is based on the reports of reliable observers (schoolmasters or peasants) instructed to note daily the dietary standard in each house in the villages.

EDUCATION.

The domestic economy schools in the country for women and young girls are founded and maintained by the Ministry of Public Instruction and by a number of private women's associations, by the Central Health Institute at Belgrade, the Public Health School at Zagreb and other public health institutions throughout the country.

The teaching staff for such schools and courses are trained at the higher domestic economy school at Stari Futog, which is attended by eighty students. There are 497 domestic economy schools and courses, all permanent. Many of them are maintained by the State, while a

smaller number are maintained by the banovines. There are also travelling courses, where the municipalities ask for them; the municipalities in such cases have to take a share in their maintenance. In 1935, in the different banovines, there were 104 courses of this kind with 2,333 pupils. There are also a considerable number of private schools and courses of domestic economy.

POPULAR INSTRUCTION.

Permanent health exhibitions have been organised at the health institutes of Zagreb and Belgrade, and there are similar exhibitions also in the fifty public health institutions. They are of an itinerant nature and move from village to village, carrying an ample supply of propaganda material in favour of rational nutrition. They are well attended; all schoolchildren and soldiers are required to visit them.

The Yugoslav Temperance Association organises "fruit weeks" every year in towns of a certain size, during which propaganda is carried on to encourage the consumption of fruit.

REPORT OF THE SUB-COMMITTEE ON FOOD STATISTICS OF THE MIXED COMMITTEE ON THE PROBLEM OF NUTRITION.

GENERAL REMARKS

In accordance with the decision taken by the Mixed Committee on the Problem of Nutrition at its first session in February 1936, the Sub-Committee on Food Statistics held a meeting at the International Institute of Agriculture, Rome, on March 13th to 16th, 1936, under the Chairmanship of M. J. J. L. van Rijn.

The purpose of the meeting was :

(a) To enable the Mixed Committee on the Problem of Nutrition to obtain as clear a picture as possible of the statistical material available on the production, human consumption and prices, including the trends in recent years, of foodstuffs (cereals, sugar, milk and other dairy products, meat, poultry and eggs, fresh vegetables and fruit), with special reference to the " protective " foods ;

(b) To suggest the directions in which Governments should be urged to improve their statistical information in this field.

The Sub-Committee also discussed the collection of data concerning the extent and purpose of the financial assistance received by national agriculture directly or indirectly from Governments and/or other public authorities.

REPORT.

The Sub-Committee considered the moment opportune for drawing attention to statistics of food consumption and for stimulating the interest of Governments in view of the fact that, during the year, both the annual Conference of the International Labour Organisation, the Assembly of the League of Nations and the General Assembly of the International Institute of Agriculture would discuss questions of nutrition in relation to agriculture. Moreover, the meeting of representatives of Government statistical services, which the International Institute of Agriculture proposes to call this year for the purpose of preparing for the World Agricultural Census of 1940, might provide the means of taking practical steps towards realising some of the measures proposed in this report.

The Sub-Committee decided to exclude from its consideration, at this stage, the position in Asiatic and tropical countries.

Food Supply Statistics.

The Sub-Committee considered for each of the principal groups of products the available statistics of production, of imports and exports, of stocks, of supplies used for purposes of non-human consumption, and also the information available from household budget enquiries as to the actual quantities of food purchased for household consumption. In view of the difficulties encountered in obtaining the quantities of certain foodstuffs actually used, the Sub-Committee recognised that household budget enquiries had considerable value in supplementing and correcting the information available from statistics of national production and trade. Such enquiries form, moreover, the only means of showing how food consumption varies in different social classes of the community. The Sub-Committee therefore hopes that the International Labour Office will continue to make available the results of such enquiries and to urge Governments which have not conducted such enquiries in recent years to do so.

Cereals.

It was considered that production statistics for cereals were fairly complete and reliable. Consumption statistics, on the other hand, were very difficult to obtain. They can, in some cases, however, be obtained from production, trade and stocks figures, after allowance has been made for quantities utilised for seed and animal feeding. Of these items, statistics for stocks are not, in most cases, available, though it can be said that, in recent years, there has been some improvement in the collection of these data. Another difficulty is the uncertainty as to the quantity fed to animals, which varies greatly as between different countries and from one year to another.

It was recognised that a more solid basis for estimating human consumption of cereals might be provided by adequate milling statistics. As a general rule, these statistics are not at present sufficiently complete, while in many countries they are not available.

The Sub-Committee came to the decision that the Governments of countries in which statistics of cereal stocks and production of flour are not collected should be urged to compile them, while those which do compile such statistics already might be asked to improve them and to make them more regular and comprehensive.

The Sub-Committee's attention was drawn to the fact that an exhaustive report on human consumption of wheat had been prepared by the International Wheat Advisory Committee.

Sugar.

The available data on production, imports and exports of sugar are, apart from some gaps in the figures of stocks, sufficiently accurate and complete in most countries to provide a satisfactory basis for estimating human consumption.

Milk.

The statistics of milk production were recognised to be very unsatisfactory. Very few countries possess regular annual data of milk production, and the reliability of these data is often doubtful, as the total production figures are normally arrived at indirectly from the number of milk cows and the estimated average yield per cow.

The absence of adequate production statistics makes estimates of national consumption of milk in most cases impossible. A basis for judging the trend to consumption may, however, be obtained from the quantities entering certain towns, and the Sub-Committee expressed the desire that, in order to supplement national consumption data, an attempt should be made to make use of such data. At the same time, Governments should be urged to collect or to improve their national statistics of milk production and consumption.

As regards condensed milk, statistical data of production and consumption can be obtained fairly easily, as factory output and exports can be ascertained reasonably closely and the countries where this commodity is produced in substantial quantities are few in number. It is, however, desirable to ascertain whether there are other countries which are of importance as condensed-milk producers and for which statistics are at present lacking or incomplete.

Other Dairy Products.

For butter and cheese, the statistical position is somewhat better than for milk, because data on production exist for a larger number of important producing countries. However, statistics are not always comprehensive, since, in many cases, they do not include production on farms, but are confined to factory production or to co-operative dairies. Improvements in the statistical data collected by the Governments are considered highly desirable in this branch, in view of the great importance of these products.

Meat.

The technical difficulties of a statistical study of the production and consumption of meat were discussed. It was agreed that a starting-point for estimating production could be found in slaughter-house statistics, but that it would be necessary to have uniform data, not only for the numbers of animals slaughtered, but also for the actual weight of meat produced. Moreover, slaughter-house statistics should be supplemented by reliable estimates of other slaughterings. It was considered desirable to urge Governments to improve their collection of meat production statistics in this sense, or to start collecting them where they are not at present available. For this purpose, it would be useful to furnish Governments with examples of the methods adopted in countries where these statistics are best organised.

Poultry and Eggs.

Regular statistics of poultry and egg production exist in very few countries. The chief difficulty in compiling statistics of this branch of production arises out of the small-scale character of a large proportion of the poultry industry.

At the same time, the importance of this rapidly growing branch of production is such that an improvement in its statistics is considered highly desirable.

Vegetables.

The statistics of potato production may be considered fairly complete and accurate, but they cannot supply a reliable basis for estimating human consumption, because the quantities used for feeding to animals and for industrial uses vary greatly according to countries and from year to year.

For fresh vegetables in general, the difficulty of obtaining complete statistics of production was recognised to be particularly great owing to the large quantities grown in small home gardens and allotments.

In the case of some products, such as onions and tomatoes, for which there exist sufficiently complete production statistics for several important producing countries, the position is somewhat better. For other vegetables, a possibility of approximately estimating the trends of consumption can be found in the use of municipal data on quantities brought to market in some large cities.

Fruit.

For those fruits, such as citrus fruits or bananas, for which most European countries depend upon imports, trade figures supply a satisfactory basis for estimating actual consumption. For other fruits, such as apples, pears, etc., there exist only scattered data of very unequal value.

For apples, in the case of those countries whose exports represent a substantial part of total production, the trend of production can be obtained from the trade figures.

In recent years, a certain improvement in fruit production statistics has been noted in some countries, and, though the special difficulty of compiling these statistics is recognised, the Sub-Committee considered it highly desirable that this example should be followed by other countries.

Prices.

It was agreed that statistics of prices, particularly of those relating to the productive foods, should be collected and studied. These prices should be related as far as possible to the trends during recent years in various countries, including changes in production and consumption. A comparison of wholesale and retail prices should also be made both nationally and for the principal importing countries.

Financial Assistance to Agriculture.

The Sub-Committee discussed the desirability of a study of the financial aspects of the various measures of assistance received by agriculture in different countries and of the effects of such measures upon the development of the production, imports and exports of foods in the countries concerned. Such a study was considered very useful and the Sub-Committee recommended that it should be undertaken.

Conclusions : Requests to the International Institute of Agriculture.

In conclusion, the Sub-Committee decided to ask the International Institute of Agriculture :¹

(a) To furnish such information as exists on the consumption of cereals, sugar, meat, milk and other dairy products, poultry and eggs, fresh vegetables and fruit ;

(b) To show as far as possible the trends of production, consumption and prices of these products in those countries for which reasonably complete statistics are available ;

(c) To obtain municipal data on the quantities of milk and fresh vegetables entering certain large cities and to utilise these data to supplement the information referred to under (a) and (b) ;

(d) To continue its established policy of improving agricultural statistics, giving special attention to the deficiencies in the material now available on the protective foods, and to draw the attention of each Government to the particular directions in which improvement is desirable ;

(e) To collect data bearing on the financial aspects of the assistance received by the national agriculture of various countries and on the effects of such assistance on the production, imports and exports of foods ;

(f) To collect and study wholesale and retail prices, particularly of the protective foods, and to relate such price data to the trends in production and consumption in various countries.

* * *

Annex.

MEMORANDUM BY THE CHAIRMAN ON THE NEED FOR INVESTIGATING THE EFFECTS OF A WIDESPREAD IMPROVEMENT OF POPULAR NUTRITION UPON THE DEMAND FOR AGRICULTURAL PRODUCTS.

During the discussions in the Sub-Committee, the question was raised whether an attempt should not be made to indicate by a few

¹ The results of the enquiries undertaken in accordance with these requests are contained in Volume IV of the report of the Mixed Committee entitled, "Statistics of Food Production, Consumption and Prices."

examples the extent to which the demand for agricultural products might be increased, if it were found possible to effect improvements in nutrition on the lines advocated by the hygienist and the physiologist. From the hygienic standpoint, it should not be difficult to convince the authorities in the different countries of the great social importance of improvements in nutrition, alike for Governments and for the great mass of the population.

From an economic standpoint, it appeared desirable that a connection should be established between the movement which the League of Nations desires to organise and the agricultural departments and associations in the different countries.

The Sub-Committee's report indicates the statistical information which is available and which might be introduced into the Mixed Committee's preliminary report, and formulates recommendations to be made by the League to the Governments and to municipal authorities for the improvement and completion of their statistics, particularly as regards the production and the consumption of protective foods.

The Sub-Committee was unanimously of opinion that it is highly important that certain statistical information should be collected, having reference to the probable consequences of an improvement in nutrition on the demand for agricultural food products. In present conditions, it is, as a matter of fact, impossible for the time being to give a complete and accurate statistical picture in this regard, or to consider the question from a world point of view. It is, however, believed to be possible to present certain illustrations indicating the probable increase in demand which would follow on the adoption of an optimum regime of nutrition by the majority of the population in different countries. If it were successfully demonstrated to all who are principally interested in an increase in the demands for agricultural, horticultural, animal and dairy products, how and to what degree an improved nutrition would in the end lead to an increase in consumption and therefore to an increase in demand for such products, the collaboration alike of agricultural authorities, of farmers and of the rural population would be ensured. Such collaboration would be beneficial, not only from the moral as also the social standpoint, but also in view of propaganda for better feeding in the rural areas.

Such are the reasons which have led the Sub-Committee to request the International Institute of Agriculture to add a special appendix on this subject to the statistical information to be supplied by the Institute to the Mixed Committee. To this end, an endeavour should be made to select two or more countries as to which the documentation available is sufficient to make it possible to arrive at a satisfactory conclusion. It is considered that, in addition to statistical documentation on production, consumption and stocks, a valuable source of information is to be found in the information on family budgets for certain groups of consumers collected by the International Labour Office.

Fruit Preserves.

It has also been considered that it might be desirable to investigate the question to what extent fresh fruits are converted into the form of jams and marmalades, for it has been suggested that, by such conversion, it is possible that the protective value of the fruits may be destroyed. The Institute will endeavour to obtain some information on this subject.

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[Communicated to the Assembly,
the Council and the Members
of the League.]

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Geneva, August 14th, 1937.

NUTRITION

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Final Report of the Mixed Committee
of the League of Nations

ON

THE RELATION OF NUTRITION
TO HEALTH, AGRICULTURE AND
ECONOMIC POLICY

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PART I.

Chapter 1. — Introductory.

2. — A Century of Progress in Nutrition and Public Health.

3. — Summary and Conclusions.

Chapter 1.

INTRODUCTORY.

I. The Mixed Committee on the Problem of Nutrition was set up under a resolution of the sixteenth Assembly in 1935 to study both the health and economic aspects of the nutrition problem. It consists of agricultural, economic and health experts and includes also representatives of the Advisory Committee on Social Questions, the International Labour Organisation and the International Institute of Agriculture.¹

¹ The composition of the Committee was as follows:

The Viscount ASTOR (*Chairman*), member of the House of Lords, Chairman of the Milk-in-Schools Advisory Committee (under the Milk Marketing Board); formerly Parliamentary Secretary to the Ministry of Food and later to the Ministry of Health.

Baron G. ACERBO (representing the International Institute of Agriculture), President of the International Institute of Agriculture; former Minister; Dean of the Economic and Commercial Faculty in Rome University.

Professor Thure BJOERKMAN, Secretary-General of the Royal Agricultural Academy, Stockholm.

M. C. V. BRAMSNAES (representing the International Labour Office), Director of the National Bank of Denmark; former Finance Minister, Copenhagen.

M. Ramon CANTOS, former Deputy in the Cortes, Madrid.

M. Léon DUPRIEZ, Secretary-General of the Belgian Economic Recovery Office; Professor of Political Economy at Louvain University; Director of the Institute of Economic Sciences at Louvain, Belgium.

Dr. L. FEIERABEND, President of the Grain Monopoly, Prague.

M. Casimir FUDAKOWSKI, Senator; former President of the Polish Federation of Chambers of Agriculture; Vice-President of the International Agricultural Commission; Member of the Economic Committee of the International Institute of Agriculture, Warsaw.

M. Enrique J. GAJARDO (representing the Child Welfare Committee), Head of the Permanent Bureau of Chile at the seat of the League of Nations.

M. Jules GAUTIER (deceased November 24th, 1936), Vice-President of the International Agricultural Commission, Paris.

M. Edo MARKOVIC, General Manager of the Privileged Joint Stock Company for the Export of Products of the Kingdom of Yugoslavia, Belgrade.

Professor E. V. McCOLLUM, Professor of Biochemistry, School of Hygiene and Public Health, Johns Hopkins University, Baltimore, United States of America.

Mr. F. L. McDougall, Economic Adviser to the Australian Government, London.

Sir Edward MELLANBY, Secretary-General of the Medical Research Council, London.

[*Note continued on page 10*]

The Assembly resolution made express provision for the co-operation of these two last-mentioned organisations, in view of the nature of their activities and interests.

2. The Assembly resolution resulted from a growing recognition of the importance of taking active measures to improve nutrition to which expression was given by a number of delegates during the debate on the subject. It was thought that the time had come for the League of Nations to make a thorough investigation of the

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- M. G. DE MICHELIS, Ambassador; Senator; Member of the National Research Council, etc., Rome.
Professor Edwin G. NOURSE, Director of the Institute of Economics, Brookings Institution, Washington.
Dr. Carlos A. PARDO, Commercial Counsellor at the Argentine Legation in Switzerland, Berne.
M. H. QUEUILLE, Senator; former Minister of Agriculture and former Minister of Public Health, Paris.
M. VAN RIJN (representing the International Institute of Agriculture), Vice-President of the International Institute of Agriculture, Rome.
M. STEVENS, Engineer; Inspector of Agriculture; Head of the Agricultural and Economic Information Department of the Ministry of Agriculture, The Hague.
Dr. Faith WILLIAMS (representing the International Labour Office), Chief of the "Cost of Living Division", Department of Labour, Washington.

* * *

M. HALBWACHS, Professor at the Sorbonne, Paris, took the place of Dr. Faith Williams at the first session, and of M. Bramsnaes at the second session.

M. Jan WSZELAKI, Economic Counsellor at the Ministry for Foreign Affairs, Warsaw, took the place of M. Fudakowski at the first session.

Mr. Warren C. WAITE, Professor at Minnesota University (United States of America), and Mr. Harold B. ROWE, of the Brookings Institution, Washington, took the place of Professor Nourse, the former at the first session and the latter at the second session.

M. DE MICHELIS and Baron ACERBO did not attend.

M. AUGÉ-LARIBE, representative for France and the French colonies on the Permanent Committee of the International Institute of Agriculture, attended as substitute at the first session, and replaced Baron Acerbo at the third.

Miss Charlotte WHITTON, Director of the Canadian Welfare Council, Representative of the Advisory Committee on Social Questions, which absorbed the Child Welfare Committee in January 1937, replaced M. Gajardo at the third session.

M. J. L. DE LA LOMA Y OTEYZA, chief of the Statistical, Economic and Agricultural Policy Section at the Ministry of Agriculture, took the place of M. Cantos at the third session.

Professor BJOERKMAN, M. DE MICHELIS, Dr. PARDO and M. STEVENS were unable to attend the third session.

The representatives of the International Institute of Agriculture were on one or more occasions assisted by:

- M. BRIZI, Secretary-General of the Institute;
M. DORE, Head of the Bureau of General Statistics;
Dr. PAVLOVSKY, Head of the Bureau of Economic and Social Studies.

work being carried out in the interest of improved nutrition in a number of countries, this investigation to cover at once the dietetic and economic aspects of the problem.

3. The world had just experienced the evils of a long and severe economic depression. The production of all kinds of foodstuffs had been steadily increasing; markets were glutted and producers were faced with ruin; at the same time, careful enquiries in a number of countries had shown how extensive was the failure to satisfy normal nutritional requirements. Indeed, while owners of food stocks were unable to find remunerative markets, some parts of the world were suffering from famine; in others, large sections of the population were suffering from serious malnutrition. This malnutrition, moreover, was not confined to the poorest classes. Wherever this state of affairs was found to exist, it caused the most serious apprehension, not merely on humanitarian grounds, but also because of its possible effect upon the social structure and internal peace of the countries concerned.

4. Hence the question naturally arose whether it was not the duty of the public authorities to assume the responsibilities inherent in a "nutrition policy"; to elaborate such a policy and apply it in such a manner as at once to benefit agriculture and promote public health; to combat malnutrition and, in so doing, to afford some measure of relief to the agricultural depression, especially by increasing the consumption of the so-called "protective" foods which enable men, women and children to obtain full physical and mental development, at the same time increasing their resistance to many diseases (*e.g.*, scurvy, beri-beri, rickets and other bone defects; dental caries; tuberculosis and bronchial pneumonia, which so often develop from measles, whooping-cough and other children's diseases; and also to such conditions as anæmia, night-blindness, etc.).

5. Although the concern of Governments in improved nutrition is by no means new, action has in the past generally been limited in scope. In the discussions of the seventeenth Assembly, it was suggested that it was the duty of the public authorities to extend their sphere of action. This new conception was due to research conducted over a long series of years by individuals in a number of countries. Since 1925, it has received an impetus from the Health Organisation of the

League of Nations, which has been engaged upon enquiries, conducted frequently on the spot, in regard to the state of nutrition in various parts of the world. These investigations, which were gradually extended from one question to another, culminated in 1935 in a general report on nutrition¹ which attracted considerable attention. This report, which was the work of Dr. E. Burnet and Dr. W. R. Aykroyd, was intended primarily for national health authorities, and was devoted in the main to a consideration of the importance of nutrition in public health and preventive medicine: Its authors came to the conclusion that nutrition was no longer an exclusively physiological problem and that henceforward, it must be a matter of concern to both public health officers and economists.

6. The Assembly's intention, in deciding upon an international enquiry into this matter, was not to supply the Governments with ready-made or uniform solutions, but rather to enable them to work out solutions for themselves by adapting such conclusions as might be reached by the Mixed Committee to conditions in their respective countries. The Assembly also desired to put public opinion in possession of the most recent information on this subject and to draw the attention of public authorities to a task which, if somewhat neglected in the past, is likely to demand more and more of their attention.

7. The Mixed Committee entered upon its duties in February 1936; the first session was held from February 10th to 16th and the second from June 4th to 7th, 1936. Its initial findings were recorded in an interim report, which is briefly analysed in paragraphs 12 and 13 below.

8. The International Labour Office had already taken up the problem of nutrition and had examined certain of its aspects from its own particular point of view. In pursuance of a resolution adopted at the nineteenth session of the International Labour Conference (June 1935), it published in May 1936 a general report on "Workers' Nutrition and Social Policy".²

¹ Published in Volume IV, No. 2, June 1935, of the *Quarterly Bulletin of the Health Organisation*.

² "Workers' Nutrition and Social Policy": Studies and Reports (Social and Economic Conditions), No. 23, International Labour Office, Geneva, 1936. 249 pages.

In this report, emphasis is laid on the fact that "large numbers of the working population, not only in impoverished or depressed areas, but even in the most advanced industrial countries, are inadequately nourished. Such malnourishment and under-nourishment are not the result merely of temporary dislocation due to an industrial depression, though a depression usually has an aggravating influence. It is a condition found among many employed workers in times of normal business activity." The report enquires into the causes of this state of affairs. It describes what has been done to mitigate it.

9. The Mixed Committee found this report of the greatest value in regard to one of the most important points in its own programme of work. It also made use of a great variety of material obtained from a number of different sources. Some thirty countries supplied information regarding the state of nutrition of their own people and the action taken in this connection by public or other authorities. This material,¹ which related to countries of different social and economic structure, enabled the Committee to view the problem from different angles.

10. At the request of the Mixed Committee, the International Institute of Agriculture at Rome also conducted a special study on production, consumption and price statistics, which was published as Volume IV of the Committee's interim report. By the terms of the Convention that established it, that Institute is specially qualified to represent agricultural interests in any attempt to secure a harmonious adjustment between production and consumption. Its general assembly already mentioned laid stress upon the fact that it was in the farmer's true interest to satisfy the consumer's needs, as regards both quantity and quality; it urged the Permanent Committee of the Institute to neglect no single aspect of the nutrition problem as it affects agriculture, and especially to study its possible influence on agricultural production, the division of crops, the feeding of the peasant classes, the supplying of markets, etc. For this general survey, which entails a study of present conditions in the hope of discerning future trends, statistical material is an essential basis. Unfortunately, that material is far

¹ League of Nations: "The Problem of Nutrition", Vol. III.

from complete; the International Institute of Agriculture is doing its utmost to make good this deficiency.

11. The Committee had also before it the results of the enquiries conducted by the Health Organisation of the League of Nations. In addition to the Burnet-Aykroyd report referred to above, special mention must also be made of another document of first importance—namely, the “ Report on the Physiological Bases of Nutrition ”, drawn up by a Commission of scientists of worldwide reputation. The findings of this report form the scientific basis of the Committee’s work; they set out the principles of rational nutrition in the present state of scientific knowledge, and specify the nutritional requirements of the individual at the various stages of his development. It has been rightly said that the work of this Commission constituted an important date in the history of the science of nutrition.

12. In June 1936, shortly before the Assembly, the Mixed Committee published its interim report in four volumes. The report proper (Volume I); the “ Report on the Physiological Bases of Nutrition ” (Volume II); “ Nutrition in Various Countries ” (Volume III), which is a digest of the information supplied by the countries concerned or obtained from other sources; “ Statistics of Food Production, Consumption and Prices ” (Volume IV), compiled by the International Institute of Agriculture, Rome.

13. The Committee considered it expedient to submit this interim report before completing the whole of its investigations, as it was anxious to focus attention at once on certain aspects of the problem and to stimulate action. The report was accordingly devoted primarily (i) to explaining the new conceptions which, in the opinion of scientists, should govern human nutrition and to showing the effects of disregarding these rules and (ii) to the framing and exposition of a series of recommendations which it suggested might constitute the general guiding principles of national nutrition policies. In framing these recommendations, it made it clear that they were not intended to be more than suggestions which would require to be adapted to national conditions.

The economic and agricultural aspects of the problem, referred to briefly in the interim report, were reserved for fuller treatment later. The present report is primarily concerned with them.

14. The report submitted in 1936, although only provisional aroused very general interest. The welcome given to it by public opinion, to judge from the Press comments in many countries, shows the importance attached to this question, with which the tranquillity of the world is so closely linked. The Mixed Committee's work came at the right moment and strengthened the efforts of the many national organisations which are trying to initiate action along these lines or to further such action where it is already being taken.

15. The seventeenth Assembly endorsed the guiding principles of policy put forward by the Mixed Committee and recommended their adoption by Governments. At the same time, it decided to give a fresh impetus to the studies undertaken, both those devolving on the Mixed Committee and those of a more specialised nature which fall to the Health Organisation. Among the recommendations endorsed was one to "co-ordinate the work done by different authorities which affects the nutrition of the people and, in the absence of a central authority, to set up a special body for this purpose in order to secure unity of policy and direction". With a view to co-ordinating the activities of these committees—some of which had already been set up—the Assembly suggested that it might be well to arrange for an exchange of views and experience between their leading members.

16. A meeting of representatives of a number of National Committees was accordingly held at Geneva from February 22nd to 26th, under the chairmanship of Lord Astor. The agenda was confined to the following points:

1. Status and composition of National Committees;
2. Work already done and in progress; methods to be employed in order:
 - (a) To assess the state of nutrition of the national population;
 - (b) To spread the principles of improved nutrition among the population.

Each of these points afforded an opening for interesting discussions. Those present at the meeting described what had been done in their respective countries to introduce new food-consumption habits, to improve the state of public health and maintain the improvement when secured. A wide variety of methods has been employed, but there is general agreement on the need for spreading a knowledge of the value of protective foods and of the importance of a correct balance in the daily diet. Much striking evidence was produced of the effect of such a balance on health and growth, especially in the case of children, but there is equally abundant and striking evidence that an " optimum condition " is rare, not to say exceptional.

17. The composition and status of National Committees vary in different countries; indeed, rigid standardisation would make them unadaptable to national conditions. The members of the meeting unanimously agreed, however, that those bodies should be so constituted as, in the Assembly's words, " to secure unity of policy and direction ". One essential condition for this seems to be that they should be incorporated in the State administrative organisation. A National Committee that depends entirely on private initiative for its driving power and its finances, as some do, is undoubtedly not in a position to perform its functions satisfactorily.

On the other hand, National Committees are likely to be greatly strengthened by the addition of members who are not Ministers of State or State officials.

In some countries, the creation of non-Governmental committees alongside the official National Committee may prove of real value.

18. It is plain that a national nutrition policy must be based on periodical enquiries into food-consumption habits. The methods generally employed to determine the state of nutrition of the population were discussed at length and a number of principles and rules for guidance embodied in an *aide-mémoire* which will, it is hoped, be elaborated by a technical committee of the League's Health Organisation. As long ago as 1926, the International Labour Office held a conference of labour statisticians, and published a report on methods of securing and analysing data on consumption of food and other goods and services by workers. The expert members of the Committee advising the International Labour Office

on nutrition have recently recommended to the Governing Body of that Organisation to arrange for a further international discussion on the subject in collaboration, especially, with the experts of the League Secretariat and of National Nutrition Committees. The Committee attaches importance to effective co-operation between these organisations in order to improve the methods used in such investigations and, in the interest of international comparisons, to secure their greater uniformity.

19. Since the publication of the Mixed Committee's interim report, the Health Organisation of the League of Nations has undertaken a series of relevant studies. It is thus making a valuable contribution to our knowledge of the general problem, the scientific aspect of which still offers great openings for research.

20. The authors of the report on "The Physiological Bases of Nutrition" already mentioned recommended, when submitting their conclusions, the following ten problems for further study:

1. Assessment of the nutritional state of children.
2. Nutritive food requirements during the first year of life.
3. Minimum vitamin and mineral requirements.
4. Minimum fat requirements.
5. The nutritive and "supplementary" values of the different protein-containing foods, to determine to what extent and in what forms animal protein is necessary for growth and health.
6. The relative nutritive value of different cereals according to the degree of milling.
7. The extent to which the increasing consumption of sugar is detrimental to health.
8. Influence of climate on food requirements.
9. The extent to which diets in common use fall below the standards recommended in this report.
10. The optimum amounts of milk required at different ages.

This list was later amplified by a proposal for special investigations on the subject of milk, more particularly the additional nutritive effects of the reciprocal action of the dietetic elements contained in milk on the one hand, and cereals and potatoes on the other.

21. The first of the subjects mentioned above—assessment of the nutritional state of children—was considered at a meeting of experts held in Geneva in December 1936. These experts recommended

several types of enquiry according to the number of children whose state of nutrition was to be examined.

As a first type of enquiry, aiming at the rapid classification of a large number of individuals, they suggested that cards should be compiled showing age, sex, physical appearance, weight, height, and the results of a simple clinical examination. A second type of enquiry, involving more thorough examinations and covering a smaller number of individuals, includes, in addition to the tests employed in the first type, an economic and social investigation (more especially into the diet of the family and the child), a thorough medical examination, and a series of tests, particularly tests for latent predeficiency in vitamins A, C and D. A third type of enquiry aims at the scientific study of the influence of a quantitatively or qualitatively deficient diet on all the functions of the organism, both physical and mental. Enquiries of all these kinds are now being conducted in certain countries. In Sweden, they are to cover 50,000 children; in Czechoslovakia, 10,000; and in Austria, 20,000. Similar investigations have also been in progress for some time in the United States of America, the United Kingdom, Poland and Norway.

22. A second group of experts, which consisted chiefly of pediatricists, devoted its attention to determining the nutritional requirements during the first year of life, more especially in calories, proteins, carbohydrates, fat, mineral salts and vitamins. It set out its findings on the length of the period of breast feeding and of artificial feeding, on the administration of orange-juice, tomato-juice and cod-liver oil, and on the use of cereals, broth, vegetables and eggs in the diet of infants.

23. The experts of the Health Organisation decided, moreover, to arrange for the study of the following three questions:

(a) Has the daily administration of more than 750 c.c. of cow's milk to children between six months and one year any unfavourable influence on the nutritive exchanges and, in particular, on the absorption of calcium and iron ?

(b) What are the differences between the action of an artificial preparation of an irradiated sterol and that of irradiated milk, when quantities containing the same number of international units of vitamin D are administered ?

(c) Is it desirable to provide systematic preventive treatment against anæmia for all children between four months and one year by the administration of an iron salt ?

All the other problems mentioned in points 3 to 10 above are being studied by scientific institutions and learned societies in a number of countries. This procedure has been adopted in order to allow of full consideration being given to differences in geographical, economic and social conditions.

24. Finally, experts in several countries have studied the methods adopted for providing the population—more particularly nursing mothers, infants at the breast and children—with an abundant supply of milk which, as a result of the technical supervision of its production and the methods of preservation and distribution, can be relied upon to be pure.

These studies are a continuation of those which have been on the Health Organisation's programme for the past six years and on which several publications have already appeared.¹

The report on the investigations of these experts, which will be issued shortly, considers the milk problem in its various aspects—nutritional, economic, social, veterinary and medical, all of which must be borne in mind in attempting to define a national milk policy.

The results of these studies on such an essential food as milk constitute, in regard to a large number of countries, a source of information the value of which can scarcely be overrated.

* * *

25. The International Labour Organisation, for its part, was not inactive. Two resolutions adopted at the Conference at Santiago de Chile in January 1936, which was attended by the American States Members of that Organisation, recommended a series of studies and surveys on the nutrition of workers. In June 1936, the International Labour Conference (twentieth session), after discussing the Office's initial report on "Workers' Nutrition

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and Social Policy ", expressed the view " that the nutrition of the workers should be considered as one of the most important problems which the International Labour Organisation has to solve ". At the same time, it invited the International Labour Office to continue its studies in this field.

26. Several other international organisations have shown by their discussions and expressed in resolutions the importance attached by them to the Mixed Committee's work and their desire to co-operate. As already mentioned, a representative of the Advisory Committee on Social Questions sits on the Mixed Committee. A delegate of the International Committee on Inter-co-operative Relations was also asked to attend the proceedings of the Mixed Committee in 1937. The reports of this Committee on Inter-co-operative Relations described the efforts which co-operative organisations have employed to enlighten and guide their members, both consumers and producers, on nutrition questions. We desire to draw attention to the help which these bodies can give to public authorities in their efforts to promote nutrition and to suppress fraud. The League's Advisory Committee on Social Questions has, in execution of the seventeenth Assembly's decision, placed on its agenda the study, in collaboration with the Health Organisation and the International Labour Office, of the social effects of malnutrition on children of both rural and urban populations. The International Commission of Agriculture, at a meeting held in July 1936 at Oslo, stressed particularly the economic importance of the problem and the need for a thorough study of the food position of the agricultural populations in connection with agricultural depression and unemployment. Lastly, the General Assembly of the International Institute of Agriculture, held in October 1936, decided to strengthen its collaboration with the Mixed Committee and laid down the lines of its own work and investigations on the subject of nutrition.

27. The Mixed Committee has also received ample evidence of the close attention paid to its work by many private organisations and associations.

28. All these various bodies and interests, inspired by a common aim, have given valuable support to the Mixed Committee. The latter can regard its task as completed if its conclusions furnish

all those interested in the problem with a basis for a working programme designed to secure greater health and prosperity.

29. The Mixed Committee held its third and final session from April 12th to 17th, 1937, and approved the contents of its final report. It charged a Drafting Committee with the task of final editing; the Drafting Committee met from June 11th to 13th, 1937, and approved the report in its present form.

30. This final report is, like the interim report, mainly concerned with conditions in Europe and countries with a Western civilisation. If it proved necessary for the Committee to exclude Asia, Africa and tropical countries generally from its detailed studies, this was not due to any belittling of the importance of the question in those areas. On the contrary, the Committee considers that the problem is particularly acute in these parts of the world and calls for urgent attention. But it found from the outset of its work that it would encounter insurmountable difficulties, in present circumstances, in obtaining adequate documentation in the time at its disposal. Moreover, as explained below, the Committee understands that appropriate initial measures are being taken by the Health Organisation with a view to promoting a full consideration of the problem of nutrition in the Far East.

The Governments of these countries or those responsible for their administration are faced with an immense task. Hundreds of millions of persons dwell in these parts of the world. It is notorious that a large proportion of them live in a stage of continual malnutrition; but up to the present very little systematic information on this point has been collected. Studies have, however, recently been initiated. Thus, the Government of the United Kingdom is at the moment pursuing an extensive enquiry into the state of nutrition in the colonial territories under its authority. Moreover, an international Governmental Conference on Rural Hygiene in Eastern Countries will meet in August of this year in Bandoeng (Java) under the auspices of the Health Organisation of the League of Nations. This Conference has adopted nutrition as one of the most important points on its agenda. The League Organisation is thus actively engaged upon the problem of nutrition in Eastern and tropical areas.

31. Within the limits defined in the preceding paragraph, the Mixed Committee has set out in this final report its views on the nutrition problem as a whole, in its health as well as in its economic and agricultural aspects. The physiological side of nutrition, which constitutes the basis of the Mixed Committee's work, had already been dealt with exhaustively in the interim report, but it was felt that the final report should be complete in itself; accordingly, the section of the interim report dealing with nutrition and health has been reproduced with such minor modifications as recent research has made necessary (Part II of the Final Report). In addition, desirous of setting the present movement towards better nutrition in its correct perspective in relation to improvement in public health generally, the Mixed Committee has very briefly summarised the evidence of the remarkable improvement in health conditions which has occurred in certain countries during the past two generations, and has endeavoured to indicate the part which better nutrition has played in this improvement and the part which it may be expected to play in further improvement in the future. (Part I, Chapter 2).

32. In accordance with the instructions of the seventeenth Assembly, however, the bulk of this report deals with the economic and agricultural aspects of the nutrition problem. Believing that Governments, in considering their nutrition policies, would wish to know whether the changes in diet recommended by modern physiology were likely to involve any important break in consumption and production habits, the Committee has devoted a considerable part of this report (Part III, Chapters 1 and 2) to tracing the recent tendencies in food-consumption habits and in agricultural production. It has endeavoured to analyse the factors responsible for the changes observed and has studied the effect of improvements in agricultural methods on food supply, the effect of better feeding on agriculture and the obstacles to agricultural adaptation.

The general conclusions reached are that food habits in Western communities have been tending to change in the right direction, and that not only world agriculture but also the various national agricultural systems should benefit from the increased demand resulting from an extension of the movement towards better nutrition.

The problem of food prices is analysed in Part III, Chapters 3

and 4, where consideration is given to the effect of prices on consumption and to the effect on prices of efficiency of production, commercial and marketing policy and distribution costs. In Chapter 5, the Committee has analysed the rôle of income in determining nutritional levels, and in the next chapter it has devoted its attention to the part which education in the principles of correct nutrition plays and can play in determining food habits.

In Chapter 7, evidence is presented to prove that, in spite of the gradual improvement in nutrition which has been traced in earlier chapters, malnutrition remains to-day a serious threat to health and well-being. The Committee shows that, in countries of the most diverse social structure and general plane of living, appreciable sections of the population are, for one reason or another, failing to secure enough of the foods which the modern science of nutrition regards as essential for health and efficiency.

33. As already indicated, this report is divided into three parts. Part I includes, in addition to this Introduction, the broad outline of trends in public health referred to in paragraph 31 above, and, in Chapter 3, the conclusions reached by the Mixed Committee. This first part is intended to provide, in brief summary form, a statement of League activity in connection with nutrition, an outline of the results of the enquiry conducted by the Mixed Committee, and an account of the conclusions which it reached as a result of its studies and deliberations. Part II contains a revised reproduction of the section of the interim report which dealt with nutrition and health. Part III deals mainly with the agricultural and economic aspects of the problem and with the evidence of malnutrition in a number of countries.

It is believed that this division of the report will prove convenient; the Mixed Committee expresses the hope that those concerned with the formulation and administration of nutrition policy will give careful attention to the detailed analysis contained in Parts II and III as well as to the broad generalisations of Part I.

Chapter 2.

A CENTURY OF PROGRESS IN NUTRITION AND PUBLIC HEALTH.

1. Before proceeding to a full consideration of the problems of nutrition, it may be interesting to examine the part that nutrition has played in the increase in population and general improvement in public health and welfare during the last century or century and a half.

2. Until the latter half of the eighteenth century, the population of Western Europe appears to have remained for many centuries on balance almost stagnant. Periods of normal growth of the population were constantly interrupted by famine and pestilence. Any increase was therefore halting and uncertain. The population of France, for instance, estimated at 20 millions in the thirteenth century, was about the same at the beginning of the eighteenth, although fluctuating widely in the intervening centuries.

3. Towards the end of the eighteenth and beginning of the nineteenth centuries, important changes occurred. In the first place, fluctuations in population were reduced and the trend became definitely upwards. Thus, whereas the population of England and Wales had only increased by some 700,000 in the 110 years preceding 1714, between 1801 and 1901 it increased by 23.6 millions, in spite of large-scale emigration. The population of France, stationary for so long, increased by 11.4 millions, while in Europe as a whole the increase was even more striking. In the hundred years ending in 1900, the population of Europe grew from 187 millions to about 400 millions, to reach probably not far short of 520 millions in 1933.

4. This enormous increase in population was not due to a rise in the birth rate, but to a considerable although gradual decline in the death rate; a marked extension took place in the average span of life of the individual. The expectation of life at birth for

the average German increased between the 1870's and 1924-1926, from 35 years to 56. The Englishman's average length of life increased from 41 to 55.6 years between the 1870's and 1920-1922, and has since increased still further. A similar tendency was to be observed in the other countries of Western civilisation.

5. Not only did population grow rapidly and the average expectation of life rise, but general health and physique improved at the same time. The incidence and fatality of many diseases fell off progressively during the nineteenth century, and there was undoubtedly an increase in stature. In those countries of Northern and Western Europe where conscription has existed since the beginning of the nineteenth century, measurements of hundreds of thousands of young men are taken each year. The average based on these measurements shows a striking though gradual increase. In Sweden, the average stature increased between 1840 and 1926 by over 3 inches (8 cm.). In Denmark, the same increase took place between 1840 and 1913. In Norway, the increase was 4 inches (10 cm.) between 1800 and 1900, and, in the Netherlands, about 5 inches between 1850 and 1907.¹

A similar phenomenon has been observed among both male and female students at American universities.

6. This improvement in vitality and physique was not the result of chance or natural selection. Two main influences appear to have been largely responsible. On the one hand there was a rapid growth of wealth, resulting mainly from advances in scientific knowledge and its application; the consequent technical progress in industry and agriculture, particularly through the introduction of machinery; improvements in transport—roads, canals, railways and steamships; and the development of banking and credit. The national income began to increase much faster than hitherto and the social conditions—housing, clothing, cleanliness, nutrition and education—of the lower-income groups were gradually improved. The developments which accompanied and followed the agricultural and industrial revolutions made available increased supplies of commodities of all kinds and particularly of food. The first chapter of Part III of this report gives statistics showing the

¹ WROCZYNSKI, C.: "Physique and Health", *Bulletin of the Health Organisation*, League of Nations, Vol. VI, No. 3, 1937.

rise in the quantity and variety of foods consumed during recent generations. Fresh fish, meat, fruits and vegetables became available throughout the year and to larger sections of the population. The national diet was supplemented by hitherto rare or unknown foods from distant lands.

7. In addition to this improvement in economic welfare, important advances were made in sanitation and medical knowledge. Even before the development of modern medicine and the new science of bacteriology gave a clearer understanding of the nature and causation of disease, sanitation, personal and public cleanliness and vaccination against smallpox had contributed much towards the reduction of sickness and death rates.

8. There was thus an improvement both on the "positive" side in building up health, physique and resistance against illness generally, and on the "negative" side in controlling and preventing diseases.

We can obtain some idea of the relative importance of the two main groups of factors—the economic and medical—in bringing about the improvement in general health and the resulting decrease in mortality rates during the last hundred years by observing the times at which these changes took place. It is thus important to note that the population increase and decline in the death rate from a number of diseases (especially tuberculosis) had started and got well under way before the new medical and bacteriological discoveries had been made or applied. This suggests that the social and economic progress which had been gradually taking place since the time of the industrial revolution played an important and perhaps dominant rôle. It has been seen that the rise in economic prosperity resulted, in particular, in an improvement in diet, but it was not possible at the time to understand fully the connection between the dietary changes and the decline in mortality.

9. Meanwhile, however, developments were taking place in the science of nutrition which have helped to throw some light on the nature of the relation between diet and health.

For a hundred years after LAVOISIER had first studied man as a machine capable of using the energy of food for his own activities, most attention was fixed on this energy aspect of nutrition. In these years, it was also found that some protein in the food was essential

for growth and existence and that certain mineral and other inorganic elements were also necessary.

In the present century, this quantitative aspect of food was supplemented by discoveries which indicated the great qualitative difference in the natural value of foodstuffs independently of their total protein, fat and carbohydrate content. Thus, proteins were found to differ, those of milk and meat having greater value to the body than the protein of cereals. The discovery of vitamins emphasised this qualitative aspect of dietetics and, in particular, made men realise that food, in addition to supplying the material for energy and growth, held a dominant position in regard to health and disease.

In the first place, it was found that a number of diseases, whose causes were hitherto unknown or merely suspected, were due to dietetic errors. Rickets with its bony deformities, one of the scourges of Western civilisation, and beri-beri, a scourge of the rice-eating communities of the East, were shown to be dietetic in origin and easily preventable. Similarly, it was shown that scurvy, which caused such great losses in merchant ships on long voyages, could also be prevented and cured by the right type of food. The list has been rapidly extended, and it is now known that many common defects in bone structure which render fracture frequent and are not obvious to ordinary examination are due to wrong feeding, especially in infancy and childhood. The structure and regularity of the teeth and the growth of the jaws were found to depend on the diet of early life, and the occurrence of dental decay was evidently correlated with this defective structure. The drain on the pregnant mother of substances in her body during pregnancy and lactation were shown to call for good feeding during these periods in order to maintain her health. It also became apparent that defective feeding often reduced the resistance of individuals to infection, so that the properly fed child or adult might either escape some types of infection altogether or not succumb to the more serious complications that sometimes follow. Thus resistance to many of the serious infections of infancy and childhood, including tuberculosis, was found to be affected by diet. Some defects of the eyes—as, for instance, night-blindness—were also shown to be dietetic in origin and could be easily prevented and cured. Indeed, it became clear that many organs of the body might become defective

in structure and a large number of conditions of ill-health be brought about by diets which hitherto have been regarded as satisfactory. An understanding of these facts made it possible to classify food-stuffs into two main categories: one of foods which are mainly energy giving, such as cereals, fats, sugar, etc.; the other of protective foods rich in vitamins and mineral salts, such as milk, green vegetables, raw fruit, cod-liver oil, etc. An adequacy of both categories of foods was found to be necessary in order to secure optimum health, physique and resistance to disease.

10. Recent observations and experiments have confirmed these important discoveries of the prominent rôle played by nutrition in developing health and physique. The world war afforded a striking demonstration of the effects of a deterioration in diet, when other factors (housing, sanitation, medical knowledge, etc.) were practically unchanged. The general death rate, and especially the death rate from tuberculosis—a still more sensitive index of nutrition conditions—rose in all countries (belligerent and others) where food restrictions were imposed on the population. The greatest rise occurred when and where the restrictions were most severe. The food-producer on the land suffered less than the city dweller, because he could always keep some foodstuffs for his own use. On the other hand, the inmates of prisons, asylums, etc., suffered most because they had no possibility of supplementing the official rations.

In Germany, while the rise in the tuberculosis death rate from 1914 to 1918 was but 23% in the agricultural State of Bavaria, it was as much as 65% in Berlin. In Roubaix and Tourcoing, two industrial towns of occupied Northern France, the rates rose by 101% and 183% respectively.

11. A further illustration is afforded by the effects of war-time food shortage on children. Their special food requirements for growth render children particularly sensitive to dietary deficiencies. Failure to achieve normal growth can easily be measured. This has been done for the school-children of Berlin. Those born and brought up during the war were definitely stunted. Thus, the children born in 1918 who entered school in 1925 were 2 to 2½ inches (6 to 6.5 cm.) smaller and 2 to 3 lb. (1 to 1½ kg.) lighter than those who entered school in 1933. The difference was even

greater for children leaving school (aged 13-14); it was from $2\frac{1}{2}$ to $3\frac{1}{4}$ inches (6 to 8 cm.) in height and from 8 to 12 lb. (4 to 5.5 kg.) in weight. In Leipzig, similarly, the average height of boys increased by $3\frac{1}{2}$ inches (7.5 cm.), that of girls by $4\frac{1}{2}$ inches (10.5 cm.), from 1918 to 1933.

12. Additional evidence has been provided by recent experiments showing the rapid gain in stature and weight of children resulting from the addition to their usual diet of a school meal, or even of a glass of milk daily. Thus, in a boys' home near London, a gain of 7 lb. (more than 3 kg.) in weight and of 2.63 inches (6.7 cm.) in height in a year was recorded for boys who received half a litre (a pint) of milk daily in addition to the ordinary diet; others not receiving the additional milk gained only 3.89 lb. (1.7 kg.) and 1.84 inches (4.7 cm.) during the same period.

The milk therefore accounted for an extra gain of 43% in height and 81% in weight. Similarly, milk given twice daily in Paris to school-children for six months resulted in a 40% extra gain of weight in boys and 65% in girls, as compared with children who had not received additional milk (1.67 kg. against 1.19 kg. in boys; 1.63 against 0.99 kg. in girls).

Many similar experiments might be cited from Japan, New Zealand, Norway, Scotland, the United States of America, etc.

Moreover, the bodily gain was as a rule accompanied by a reduction of minor ailments and infections and by a definite improvement in vitality and in school results.

13. Other striking examples, such as the suppression of beriberi—a disabling and often fatal illness among the coolies of Malaya—by the mere addition to their usual diet of a cheap vitamin B extract, provided further confirmation of the close relation of food to health.

14. Despite these impressive instances of what can be and has been achieved through positive correction of the diet, it is essential to realise that our knowledge of nutrition and of the other sciences on which public health policy must be based is not static, but is constantly progressing. From time to time, new discoveries are made which may not only add to our knowledge, but may also modify the emphasis to be placed on facts already known. Such discoveries will be studied by the Technical Commissions of the

Health Organisation of the League. As new knowledge is accepted and made known by scientific bodies, it will be part of the function of the National Committees to consider the policies best adapted for its application.

15. Even without further discoveries, however, there is, immense scope for the application of existing knowledge. For instance, the fact that improvements in stature are still taking place in a number of countries and that a large proportion of recruits are still rejected on account of physical defects indicates that, although progress has been real, there is still great room for improvement.

16. Moreover, an examination of vital statistics in various countries shows large differences in mortality rates both as between different countries and between richer and poorer districts in the same country. Thus the death rates in New Zealand and the Netherlands, for instance, are less than one-third of those prevailing in some countries of South America, Africa or Asia; and in some cities, as London, Berlin and Paris, general mortality rates in poor districts are 50% higher than in the wealthier ones, while tuberculosis mortality is often four times as high in the former as in the latter, and the corresponding proportion of infantile mortality is as 2 to 1.

Similarly, the corrected¹ general mortality rate in a depressed area such as Merthyr Tydfil (South Wales) exceeds that of a well-to-do district such as Epsom and Ewell by 166%.²

17. There is no doubt that improvement in social conditions, and especially in the feeding of the population in these poorer countries, boroughs and districts, would bring about a considerable increase in health and save many lives.

18. Elsewhere in this report the importance of nutrition in the prevention of disease and in the growth and health of the child and the adolescent has been clearly set out. Here we have shown how nutrition has played its part in the present stage of human

¹ The corrected rate is a rate in which due allowance has been made for variations in the age composition of the population.

² Computed from figures in "The Registrar-General's Statistical Review of England and Wales for the Year 1935", Part I. H.M. Stationery Office, London, 1936.

progress in countries of Western civilisation. From what has been said, it is clear that, if Governments can achieve for their peoples adequate levels of food consumption, further progress, in no way less spectacular than that achieved during the nineteenth century, can be made in increasing the quantity and raising the quality of human life. Not only will national expenditure on hospitals for the treatment of sickness be thereby greatly reduced, but improved health will certainly be accompanied by increased efficiency and a rise in material welfare and happiness. Medical science has already made great strides in the control of disease: in this advance, the science of nutrition has participated, but the application of the "Newer Knowledge" has only just begun. If the hope which nutrition holds out can be transformed into a reality, entirely new perspectives will be opened up for the improvement of human welfare.

Chapter 3.

SUMMARY AND CONCLUSIONS.

A. SUMMARY OF THE REPORT.

1. The problem of nutrition necessarily varies widely from one part of the world to another. In some countries, an adequate diet is probably within the reach of the majority of the population; in others, practically all live but little above bare subsistence level. In some countries, food prices are relatively low; in others, they are high in relation to incomes. The League, through its Health Organisation, is making a special study of conditions in the Far East and certain other regions where the level of national income is generally low. Until these data are available, it is impossible to draw sound conclusions as to the nature of the nutritional problems in the Far East. We have therefore devoted our attention mainly to Europe, the British Dominions, South America and the United States of America.

2. On account of differences in local and national conditions, nutrition policies must vary in different areas. But the ultimate goal must be everywhere the same: to ensure that all sections of the population obtain an adequate diet. By an adequate diet we mean one which includes sufficient of the energy-bearing and protective foods for optimum health.

3. We have tried in the body of our report to show that the tendency towards better nutrition in the countries with which we have dealt is natural and strong; but that the movement is checked and obstructed at certain points, and requires to be directed and accelerated.

4. We have argued¹ that food habits, at least in many parts of Western communities, have gradually been tending to change in the right direction; and have adduced statistical evidence to show that these communities, on the whole, are now consuming,

¹ See Part III, Chapter 1.

in addition to the indispensable foods of high energy value, more milk and dairy products, more fruit and more vegetables than a generation ago.

5. This improvement in the general level of nutrition has resulted in part from a better understanding of dietary needs, in part from a general increase in income and prosperity and in ease of transport, and in part from improvements in the methods of production and in the distribution of agricultural products. It is impossible to differentiate clearly between the influence of agriculture on demand by the provision of cheaper and higher-quality food and the influence of enhanced demand on agriculture. Where the incentive has originated rather in increased demand, agriculture, as we have endeavoured to show,¹ has, under the influence of remunerative prices, successfully adapted itself. The further changes which we may expect to result from the success of the present movement towards better nutrition must necessarily be gradual, and should, if wisely directed, be of great benefit to agriculture by increasing the demand for almost all classes of agricultural products.

6. The movement towards better nutrition has made considerable progress, but it has not gone nearly far enough. Poverty and ignorance remain formidable obstacles to progress;² the disparity between food prices and incomes³ increases the difficulty experienced by the poorer sections of the community in obtaining an adequate supply of the proper foods. We have shown⁴ that, in countries of the most diverse economic structure and general level of consumption, appreciable sections of the population are, for one reason or another, failing to secure the food which is essential to their health and efficiency. The evidence that has been made available in recent years points to the conclusion that, as a result of insufficient purchasing power, or as a result of the imperfect distribution of resources between food and other objects of expenditure, or through ignorance of food values or carelessness and indifference, or as a result of the maintenance of food prices at levels involving

¹ See Part III, Chapter 2.

² See Part III, Chapters 5 and 6.

³ See Part III, Chapters 3 and 4.

⁴ See Part III, Chapter 7.

hardships to large sections of the community, or other causes, millions of people in all parts of the globe are either suffering from inadequate physical development or from disease due to malnutrition or are living in a state of subnormal health which could be improved if they consumed more or different food. That this situation can exist in a world in which agricultural resources are so abundant and the arts of agriculture have been so improved that supply frequently tends to outstrip effective demand remains an outstanding challenge to constructive statesmanship and international co-operation.

7. The movement towards better nutrition in the past has been largely the result of the unconscious and instinctive groping of men for a better and more abundant life. What is now required is the conscious direction of the natural tendency towards better nutrition. Such direction constitutes policy. Nutrition policy, if it is to be successful, must be directed towards achieving two distinct, though mutually dependent, aims. Its primary concern is with consumption: with bringing the foods which modern physiology has shown to be essential for health and physical development within the reach of all sections of the community. But, in addition, it must also concern itself with supply. Changes in demand involve changes in supply; increased demand, increased supply. Nutrition policy must take into account the necessity for facilitating the adaptation of agriculture and possibly of commerce to changes in demand and of increasing supply as demand expands. We discuss separately these two aspects of nutrition policy in the sections which follow.

B. METHODS OF IMPROVING NUTRITION.

8. Conditions determining food production, distribution and consumption differ too widely to permit of detailed suggestions being put forward for the improvement of nutrition equally appropriate for all countries. We must confine ourselves to enunciating certain general principles and to making specific suggestions of more limited applicability. We have already expressed our views concerning the general principles of policy that should be pursued in the recommendations contained in our interim report. These recommendations were adopted by the seventeenth Assembly and

communicated, on its authority, to all Governments. In the light of our further studies on the problem of nutrition, we desire to reaffirm our belief in the general policy expressed in those recommendations. Such more specific suggestions as we wish to add in the present report cannot, for the reasons we have just indicated, so appropriately be summarised in the form of a series of recommendations. They require to be considered by each nation in the light of the evidence we adduce, and in the setting of the conditions we have described or of the conditions prevailing in each individual State. We hope, however, that the body of our report will be studied by all national authorities, and that the factors affecting nutrition which need further analysis will be considered in the light of national conditions. We further hope that the general principles and the suggestions which we set out in this chapter will be applied in each country.

Recognition of Nutrition as a National Problem.

9. For nutrition policy to be effective, the problem must be recognised as one of primary national importance. During the past half century, standards of sanitation and housing have undergone remarkable changes in certain parts of the world; conditions which are to-day regarded as intolerable were fifty years ago considered normal. These standards are reflected in the greater welfare of the people. The present generation is effecting a similar change in its standards of nutrition. But the importance and future benefits of these new standards of nutrition to health and general well-being are not yet sufficiently widely recognised. It lies with Governments, supported by enlightened public opinion, to take the lead. There is no country in which conditions could not be improved with more Government help and direction; there is no country in which further measures to awaken or stimulate public opinion are not imperatively required. If Governments play their parts in giving a lead to the movement, private agencies may be expected to follow with their distinctive contributions.

National Nutrition Committees.

10. In our interim report, we suggested that a national nutrition policy requires the guidance of some central authority with special

responsibility in order to utilise to the best advantage the teachings of science, interpret them in the light of national conditions and suggest means for their practical application. In making this suggestion, we were especially influenced by the many-sidedness of the problems of nutrition and by the necessity for co-ordinating economic and social action with new physiological teachings.

11. We are now more than ever convinced of the necessity for bringing together scientists, economists, agricultural experts, consumers' representatives, teachers and administrators in National Nutrition Committees. If, as we hope, our own deliberations have been in some degree useful, it is largely due to the fact that the Mixed Committee has grouped together persons of diverse experience who have viewed the problem of nutrition from different angles—whether of health, of labour, agriculture, economics and finance, social welfare, co-operation or administration. It is our firm conviction that through National Committees adequately representative of the various elements that go to constitute this complex problem the most useful progress can be made.

12. One of the most important tasks of National Committees is, in our opinion, to ascertain the prevailing food-consumption habits and nutritional status of all sections of the population. Our own conclusions are based upon sample surveys covering a limited range of families; more accurate and detailed investigations are required. We have been particularly impressed with the scarcity of reliable information regarding the food consumption of rural populations; the paucity of the data has, indeed, prevented us from dealing with the nutritional problems of this important section of the community in sufficient detail. Several National Committees have already taken steps to ascertain facts, quantitative and qualitative, about the diets of their people; and we hope that this will be done elsewhere.

13. A further aspect of the work of National Committees on which we would lay particular stress is the interpretation of the general rules of rational nutrition in the light of national conditions. These general rules are necessarily in terms of calories, proteins, vitamins, minerals, etc. It is an important function of the National Committees to translate these into terms of specific foods, having due regard to the alternative sources from which the different

nutrients can be obtained, the consumption habits of the people, the character of national and local production, the prices of the various foods, etc.

14. Further, the question of the relationship between food prices and incomes, with which we have been able to deal only in very general terms, is clearly one which requires detailed examination in each country, with a view to ascertaining the point at which an equilibrium can be struck between the interests of the consumer, those of the domestic producer and the social and economic structure of the State. These few examples of the type of work which, in our opinion, can be appropriately carried out by National Nutrition Committees will serve to show how useful and extensive can be their activity.

15. We are convinced of the utility and importance of National Nutrition Committees for still another reason. Since our original recommendation in February 1936, such Committees have been established in a considerable number of countries. The representatives of some of these Committees, as well as of some which had been set up earlier, met at Geneva for an informal exchange of views and experiences in February 1937. We have had the advantage of hearing a detailed and interesting report on this meeting, and have been much impressed both by the amount and fruitfulness of the work being done to-day in different countries and by the value of the exchange of views which took place. We venture to recommend later in our report that the League should arrange at suitable intervals for further meetings of representatives of appropriate groups of National Committees in the future.

16. While stressing as strongly as we do the importance of National Nutrition Committees, we are fully conscious of the fact—indeed, we consider it fundamental—that the ultimate responsibility for the nutrition and health policy of a nation must rest with that nation's Government. National Committees, aided where necessary by outside advice, can, however, exercise an important influence on policy, both directly through their influence on Governments and indirectly through their influence on public opinion. For the latter important influence to be operative, it is essential that publicity should be given to their reports and findings and that they should be able to initiate investigations, etc.

17. We have no desire to lay down a doctrine on the constitution and functions of National Committees; these must vary with differences in the administrative practice and traditions of each country. We urge, however, that the Committees be so constituted as to give them a maximum of influence. To this end, it may be suggested that they should be consulted on matters of economic, social and educational policy affecting food consumption, and that they should publish periodic reports on the state of nutrition and the aspects of nutrition policy to which they attach importance.

Education.

18. We have shown in Part III of our report¹ that food-consumption levels depend primarily upon two factors—the amount of real income at the disposal of the family or individual, and the intelligent use of that income to meet food requirements.

19. Where income is adequate, the problem is one of education; but where resources fall below the limits of reasonable living standards, adequate nutrition cannot be secured even by the most scientific expenditure of those resources. Especially in the present decade, when in Western industrial countries alone millions of idle workers and their dependants are added to the population which, because of social, physical or mental handicap, is more or less permanently dependent on social assistance, the limits of educational efforts must be clearly recognised.

20. We have, however, shown² that there is some scope for improvement in the dietary habits of even the lower income groups through educational means. Surveys conducted in more than one country have revealed that, in families spending the same amount of money per head on food, some secure adequate diets while others do not. A feature of nutrition policy should therefore invariably be the dissemination of nutritional information among public authorities, voluntary services administering social aid, school-teachers and others in a position to influence food habits. The first step must be to educate those responsible for education and the administration of social aid.

¹ See Part III, Chapters 5 and 6.

² See Part III, Chapter 6.

21. The information thus disseminated should set forth the minimum nutritional needs of different age-groups and should include instruction on alternative sources of the nutritive elements. Efforts should particularly be directed towards impressing upon public assistance authorities the ultimate costliness in ill-health and bad physique of inadequate food allowances.

22. It is further of importance to emphasise the relation of adequate shelter and clothing, fresh air, sunshine, exercise and living conditions generally to the measures of nutrition policy taken to develop the general health of the people. But proper feeding, especially in early life, remains the first objective. We would lay particular stress on the desirability of close co-operation among the agencies interested in nutrition, in health generally, and in the administration of social aid.

23. Through whatever agency it may be disseminated, all nutritional information must be adapted to the habits and resources, not only of each country, but also of the particular groups by whom it is to be utilised in the individual home. The problems of rural populations are widely different from those of industrial workers. Education, if it is to be useful, must be practical, and it must cover all classes of the population—rural and urban, wage-earners and salaried classes. It should include information on alternative diets in terms of actual foods, on the preparation of diversified menus within limited income ranges. It should be devoted to arousing that interest in child and family welfare which, so far as incomes permit, will assure nutritionally adequate food consumption within such homes.

24. Moreover, arrangements should be made to inform all those working in the same field of successful local experiments for supplementing diet. We have in mind, for example, the distribution of certain foods at reduced prices to low-income groups, the organisation of garden allotments and the production or manufacture of foods on co-operative lines.

Income Level and Distribution.

25. Capacity to purchase the foodstuffs needed for adequate nutrition is determined by the size of real income in relation to

the needs of the persons dependent on that income. As we have shown in the body of our report,¹ and as the study² of the International Labour Office has pointed out, what is significant in this connection is not merely the average level of incomes, but also their distribution. Although, for example, the average level of individual incomes in industrialised countries is relatively high, large sections of the population are so poor, owing to the inequality of the distribution of the national income, that they are unable to purchase the requirements of a proper diet. Studies of food consumption at different income levels prove that malnutrition is most prevalent amongst those groups of the population, urban or rural, whose incomes per head are lowest.

26. The lower incomes may rise as a result of their recipients either sharing proportionately in a general increase in the national income or obtaining a greater share in existing or increased totals. Although it is unnecessary to stress the desirability of adding to the total sum of goods and services available for consumption, it is worth recalling that the problem is not solely one of distribution. But at any given moment the possibility of rapid progress by the method of increasing the total resources available is necessarily limited. Measures designed to protect or increase the share at the disposal of the lower-income groups have therefore been adopted in many countries.

27. It is not our intention to examine in any detail the methods which may be adopted to raise the level of incomes in such lower-income groups; but reference may be made to certain general principles that have been widely followed in seeking a solution to this problem. Since incomes in these groups consist in the main of earnings from employment, efforts have been made to safeguard these earnings to the fullest extent. Machinery for the fixing of minimum wages and legislation providing for the full and regular payment of the wages fixed or agreed on have, where adopted, performed an important function in securing to wage-earners an adequate living. For those whose incomes from employment are interrupted, whether as a result of illness or accident, or in consequence of involuntary unemployment, systems of social insurance

¹ See Part III, Chapter 5.

² " Workers' Nutrition and Social Policy ", pages 114 ff.

have been adopted in many countries. Family allowances or other supplementary measures have improved the position of large families which, as we have shown,¹ are in particular danger of malnutrition. Where such systems are lacking or have proved inadequate, Governments have in recent years afforded direct relief in various forms, especially to the unemployed. Were it not for such measures, the nutritional state of large sections of the populations of industrial States would be even more seriously defective than it is to-day. We desire therefore to emphasise the great importance of the extension of such social legislation for the protection and improvement of the health of the people.

Social Provision.

28. But the problem of malnutrition is urgent. Each generation begets its successor and passes on its heritage of disease and structural malformation. Sufficient security against the risks of malnutrition is not achieved in any country. For this reason, many Governments—and, indeed, precisely those Governments which have done most to promote social legislation—have adopted measures of direct assistance in order to supplement the diets of the more exposed sections of the community.

29. Such measures have been very properly directed especially to preventing malnutrition in childhood. The damage done by faulty feeding in the pre-natal period, in childhood and in adolescence cannot be repaired later in life. In our interim report, we stated that the health of the child was the kernel of the problem; we reiterate and emphasise this view.

30. We strongly urge, therefore, that the efforts already being made to improve nutrition by public and private health and welfare authorities in maternity and child-welfare centres, in schools and elsewhere should be encouraged and strengthened by all possible means.

31. Of special importance is the adequate consumption of milk by infants, children, adolescents and expectant and nursing mothers. At several points of our report we have referred to the high nutritive

¹ See Part III, Chapter 5.

properties of this food. Its value is unique; it is indispensable; more than any other food it contains the elements essential for life and growth. It has no satisfactory substitute and it is in itself the nearest approach we possess to a complete food. In our opinion, one of the most important immediate practical steps that can be taken, and has in certain cases already been taken, by Governments to raise the standard of health of the growing generation is to arrange for the free or cheap distribution of safe milk to children of school and pre-school age. The danger of malnutrition exists for children of most income-groups. We have shown¹ that, where there are many children in the family, the milk consumption per head tends to be low, even when the family income, and income per head, is relatively high. These facts should be borne in mind when schemes for the social provision of milk for school-children, or for initiating an educational campaign, are under consideration.

32. We refer below to the important part which school meals play in nutrition in childhood. Here we wish to point out that schemes of social provision have been directed, not only to ensuring that the nutritional requirements of children should be more adequately covered, but have, in certain cases, also taken account of the regular need for the addition of protective or other foods to the diet of certain particularly exposed sections of the adult community. In addition to such permanent provision, we would draw attention to the measures adopted in certain countries for the distribution to necessitous families of surplus supplies of food products.

School Meals.

33. We have already, in our interim report, referred to the importance of adequate nutrition during the school years as well as in early childhood. We pointed out that, while compulsory education had been generally adopted throughout the civilised world, large numbers of school-children were not mentally or physically capable of profiting by it. We therefore put the question whether, as a corollary to the provision of educational

¹ See Part III, Chapter 5.

facilities, steps should not also be taken to ensure that the nutritional needs of such children were fully satisfied, so that they would be more physically and mentally fitted to benefit from the opportunities afforded them.

34. Conditions affecting the nutrition of school-children differ so widely from one part of the world to another that it is not possible to make detailed recommendations of general application. We wish, however, to draw special attention to the fact that in several countries the diet of school-children is being supplemented by the regular provision of free or cheap meals at schools. The "Oslo breakfast" ¹ is a well-known example: this meal consists of uncooked protective foods and is served to the children before the day's work. The cost of this form of supplementary feeding for children is relatively low, and the results appear to be very satisfactory. We are of opinion that, in countries and communities where action by the central or local authorities appears to be called for, careful consideration should be given to this method of improving the nutrition of school-children. Wherever meals are provided for children at school, we wish to emphasise the importance of their being prepared in accordance with the most recent teachings of nutritional science.

35. Our attention has been drawn to the fact that, even in certain countries where most progress has been made in spreading knowledge of the correct principles of nutrition, the meals regularly provided to children attending private boarding-school are sometimes seriously defective: in some instances, milk and fresh fruit are not included (or only in quite inadequate amounts) as part of the ordinary dietary, but are treated as "extras" for which supplementary payment is required.

We believe that, in boarding-schools and similar institutions, the findings of modern science should be used in determining the diets and, that where this has not already been done, careful enquiry should be made into the adequacy of the diet at present given in such institutions.

¹ This consists of milk, bread or biscuits, butter and raw fruit or vegetables. It has the important advantage of requiring no cooking or preparation at the school.

Dietary Policies in Public and Private Provision of Food Needs.

36. Every modern State is directly responsible for the feeding of large numbers of people, whether in schools, in hospitals, in charitable and benevolent institutions, in relief centres, or in various State services, such as the army and navy. Moreover, there is a growing tendency for private industries to develop canteens and restaurants where the workers take or supplement their midday meal. We hope that, where public and private authorities are responsible for the provision of meals, they will ensure that diets adequate in all nutrient constituents are provided.

* * *

37. We have up to this point concentrated our attention on the consumption side of the nutrition question. We must now turn to production and distribution. Questions of food supply and price are important from two points of view: first, from the point of view of the producer of food, whose standard of living is largely dependent on the prices he obtains; and, second, from the point of view of the purchaser of food, whose purchasing power is dependent on the ratio of food (and other) prices to money income. It is convenient to consider these two aspects of the problem jointly in the next section.

C. THE ADAPTATION OF AGRICULTURE.

38. Improved nutrition must immediately or in a short lapse of time prove of general benefit to agriculture and fishing. Better nutrition means an increase in the demand for foodstuffs; and an increase in the demand for foodstuffs implies greater agricultural activity. Certain adjustments in agricultural production will no doubt be required; adjustments are always required whenever social progress occurs. It would, however, be a mistake to exaggerate the magnitude of these adjustments. The change in dietary habits to which we look forward will be steady and gradual: it will not occur in a day. Moreover, the majority of the protective foodstuffs (milk, vegetables, etc.) are of a perishable character, so

that they must necessarily be produced not far from their place of consumption. As these foods come to play a more prominent part in national diets, therefore, their production will offer a natural stimulus and protection to domestic agriculture. But the energy-bearing foods still remain, and will remain, the basis of the diet: they play an essential rôle in human nutrition. We have dealt in this report only with European and certain other countries of Western civilisation. If the inadequacy of the diet of the lower-income groups in these countries, even as regards energy-bearing foods, be considered, it is clear that an improvement in the nutrition of these classes should benefit the arable farmer; if the world problem of nutrition be viewed as a whole, the enormous scope for increase in the consumption and production of cereals and certain other foodstuffs valued chiefly for their energy-yielding qualities becomes at once apparent.

While national agricultural systems will thus benefit by the growth in the demand particularly for the more perishable protective foods, countries producing for export will benefit, as the primary needs of the poorer classes for energy-producing and less perishable protective foods are more adequately satisfied.

39. We have argued¹ that agriculture has adapted itself successfully—albeit not without some difficulty—during the past twenty-five years to changes in the structure of demand, in particular where increased demand has expressed itself in higher prices. The adaptation required in the future will not involve a rapid transformation of the whole structure of agricultural systems, but merely the gradual change in and expansion of production to meet the new requirements. Policy must be directed towards helping the orderly expansion of agriculture and its adaptation to the changing demand.

40. All adaptation and expansion, whether in industry and commerce or in agriculture, requires capital; but in most countries industry and commerce have far readier access to capital to assist them in their adjustments than has agriculture. In considering the agricultural aspects of the nutrition problem, we desire, therefore,

¹ See Part III, Chapter 2.

to emphasise at the outset the need for an improvement in agricultural credit. We have not been able to make an exhaustive study of the questions of agricultural assurance and credit. The question of long-term agricultural credit is one which the Financial Organisation of the League has already considered, and to which the Financial Committee has reverted in its last report. Furthermore, the International Institute of Agriculture has concerned itself in the past, and will, we understand, concern itself still further in the future, with the problem of agricultural indebtedness, insurance and credit, especially medium- and short-term credit. We hope that the appropriate national authorities will, in framing their general nutrition policy, give weight to the necessity for developing agricultural credit institutions in countries where adequate machinery does not already exist.

41. We also attach great importance to the encouragement and development of agricultural co-operation. The services which co-operation has rendered to producers and consumers alike are well known. Adjustments which are difficult for an individual producer may be facilitated by the joint action of many producers. Improvements in methods, the joint use of machinery, access to scientific knowledge, information regarding market conditions, the rational organisation of marketing—these are only a few of the benefits which have been derived from agricultural co-operative societies. These organisations should be strengthened and developed in countries where they already exist and established in countries where they do not exist.

42. The State and agricultural organisations can help the adaptation of agriculture through the education of farmers. We have in mind not only the spread of knowledge about agricultural methods and processes—an important element to which we refer below—but also the dissemination of information regarding the general trends in the demand for foods which are likely to result from better nutrition. By educating agriculturists to the importance of increasing, where possible, their output of protective foods, the State can contribute at once to an improvement in agriculture itself (through, for example, the enriching effect of animal husbandry on the soil) and to an improvement in nutrition. We are also convinced of the necessity for teaching farmers, so

far as soil and climate allow, to grow more of the protective foods for their own use.

43. The adaptation of agriculture to changed requirements can, however, be impeded as well as facilitated by State action. Thus tariffs and other forms of trade restriction may, if excessive, so affect prices as to draw farmers into the production of foods for which demand is shrinking and consequently prevent them from expanding their production of foods the consumption of which it would be desirable to increase. Subsidies to consumption, on the other hand, may provide equally valuable assistance to agriculture and at the same time serve to promote, rather than impede, the necessary adjustments. Protection to the farmer can often be given most effectively, and without prejudice to nutritional standards, by improving methods of agricultural production and distribution—by keeping the farmer currently informed of the latest discoveries of science and of market developments, by combating animal disease, by facilitating the purchase of better seed, by watching over fodder and fertiliser prices, by improving transport facilities, by strengthening the agricultural credit system, and by stimulating national consumption. Improvements in agricultural methods result in high yields per acre, while measures of artificial stimulation frequently bring under cultivation inferior land and may result in lower yields.

44. An effective method by which Governments or private bodies may encourage improved efficiency in agriculture is through the development of schemes for recording output. The value of such schemes may be enhanced by combining them with local or national competitions, which serve to arouse the interest of individual farmers and result in a rapid spread of information regarding new and successful technical methods and in their early and general application.

45. In view of the importance attached by nutritional experts to an increased consumption of fish and fish-liver oils, the development and preservation of sea fisheries by national and international action would constitute a valuable contribution to nutrition policy.

46. The orientation which should be given to commercial policy in the light of nutritional requirements is a very complex problem. Many interests are involved, and the most careful analysis

and study are required before action can be taken. We have tried to throw some light on the problem in our remarks on the elasticity of demand.¹ It should be clearly understood that the demand for protective foods cannot be greatly increased if the price of the energy-bearing foods is high in relation to incomes. Indeed, the demand for high-quality protective foods may, in such circumstances, be considerably increased by reducing the prices of the energy-producing foods. This problem requires most careful study in each country, for the solution which is correct in, for instance, a rich country or one where natural conditions favour diversified farming may well be wrong for a poor country or where natural conditions are unfavourable.

47. If steps are taken to facilitate changes in agricultural production, European as well as non-European agriculture will derive great benefit from the movement towards better nutrition. Not the least of these benefits will be the improvement in the nutrition of the agriculturist himself. We have reported² on the paradoxical fact that the producer of food in Europe is not seldom badly nourished. In certain countries, this must be ascribed in part to the fact that he has been encouraged to concentrate his productive resources on one or two crops. Now, better nutrition always means more diversified nutrition. This diversification of demand implies a reciprocal diversification of agriculture, especially more dairy and fruit farming and more vegetable-growing. Under the technical conditions of cultivation which prevail in Europe, diversification is likely in many cases, though not of course always, to affect the individual farm as well as national agricultural systems. In short, as the movement towards better nutrition spreads and grows, individual agriculturists will be encouraged to produce more of the valuable foods mentioned above, and their own state of nutrition will in consequence rise. In this connection, we may repeat that we attach special importance to the education of the small farmer to the nutritive value of dairy produce, vegetables and fruits, so that, whilst directing his chief efforts to production for sale, he will at the same time realise the importance

¹ See Part III, Chapter 3.

² See Part III, Chapter 7.

of providing, where conditions allow, foods of high nutritive value for consumption in his own household.

Food Supplies and Food Prices.

48. Farmers and consumers alike frequently complain of the wide discrepancy between the selling price of foodstuffs at the farm and their price at retail. This margin is composed of transport and distribution costs and taxes. It is clearly not possible for us to form an opinion concerning the justification of the complaints to which we have referred; but we would draw attention to the fact that certain authorities have been able to reduce the margin of cost as a result of the careful scrutiny of its component parts and the adoption of appropriate measures whenever the cost of transport and distribution proved excessive.¹

49. In view of the perishable nature of many protective foodstuffs, special attention has been paid in certain countries—rightly, in our opinion—to improving refrigeration and storage facilities and to the organisation of quick and adequate transport at low rates.

50. At the retail stage of distribution, the problem of margins is particularly complicated and difficult to analyse. In many countries, special committees have from time to time been set up to investigate it; but their findings have more often than not been inconclusive. It is, indeed, difficult to assess the cost or value of the services with which some retailers of food provide their customers—cleanliness, variety, attractiveness of presentation, credit, delivery. There are grounds for believing, however, that the volume of turnover might be increased in certain areas, were the retail margin per unit reduced, without any loss of profit to the retailer.

51. In many countries, the consumers' co-operative movement has resulted in an appreciable reduction in margins, both to its own customers and—through its competition—to those of private retail establishments. Elsewhere non-credit shops, where the

¹ See Part III, Chapters 2 and 4.

consumer does not pay for delivery which he does not require, nor for bad debts incurred by retailers on sales to their customers, have resulted in lower prices. In most countries on the Continent of Europe, special markets, where the grower of fruit or vegetables keeps his own stall, help to eliminate or reduce both overhead costs and excessive middlemen's profits.

52. A major factor affecting the prices of foodstuffs to the consumer in some industrial States is constituted by taxes on imports. Such taxes are imposed in most countries mainly to protect agriculture—revenue taxes with their corresponding excise being generally limited in number. It is for each Government to weigh for itself the claims of agriculture for protection and of the consumer for cheap food. It is not sufficient that the food supplied should be normally plentiful; its supply must also be assured. The problem of agricultural commercial policy is thus one of considerable complexity.

53. We have given in the body of our report¹ examples of comparative prices of certain foodstuffs in different countries. After all allowance is made for differences in local qualities, no one can study these tables without being struck by the very wide discrepancy in prices that exists to-day even between neighbouring States. Governments of all countries with disproportionately high prices of any valuable food should, we suggest, consider very carefully whether there are imperative reasons for depriving large sections of the community, whether they be wage-earners or others with relatively low incomes, of the advantages of cheap food which are enjoyed by other countries.

54. While each country must decide on its own commercial policy, there is one principle the universal acceptance of which we would urge—namely, that adequate nutrition be one of the factors determining such policy. The advice of nutrition and social-economic experts should, in our opinion, be sought whenever a question of agricultural or commercial policy arises. The National Nutrition Committees which we have recommended would appear to provide a useful channel through which this advice might be obtained.

¹ See Part III, Chapter 4.

D. FUTURE WORK OF THE LEAGUE OF NATIONS IN NUTRITION.

55. During the months which have elapsed since the Assembly of the League of Nations decided, in September 1935, to appoint a Committee to submit a general report "on the whole question of nutrition, in its health and economic aspects", there have been a remarkable growth of public interest in nutrition and a greatly increased realisation of its importance.

56. The problem of nutrition is, indeed, eminently suitable for international collaboration and consultation. As, however, conditions vary so radically in different parts of the world, collaboration might well at the present stage take place within continental or regional groups, where the problems are similar. For this reason, we are pleased to be able to state that the Health Organisation of the League of Nations has convened for August 1937 an Inter-Governmental Conference on Rural Hygiene in Far-Eastern Countries at which a special commission on nutrition, including some of the foremost experts of Asiatic countries, will be constituted. We are also glad to note that the seventeenth Assembly of the League of Nations decided on the convocation of an Inter-Governmental Conference on Rural Hygiene in Latin-American Countries, at which, we understand, nutrition questions will be discussed.

57. In addition to preparing these consultations, the Health Organisation will, as we have observed in the introductory chapter, continue its useful work of acting as an international clearing-house of information on nutritional questions. Moreover, having already laid down an agreed international scale of the calorie requirements of the two sexes at different ages of life, it is now proceeding to consultations with a view to setting up international standards of requirements of vitamins, minerals and other nutrients. It will also conduct and stimulate research along other important lines.

58. We have been informed also that, in accordance with the wish expressed by the Fifth Committee of the seventeenth Assembly, the League of Nations Advisory Committee on Social Questions plans, in collaboration with other competent bodies, to

pay special attention to the social aspects of malnutrition among children (whether or not cared for in their own families) in both urban and rural areas. We welcome this further evidence that the League will continue and extend its activity in this field.

59. At our first meeting, we recommended the creation of National Nutrition Committees to originate and co-ordinate policy in this field. As a result, committees have been set up in several countries and we have been informed that they are in process of being established in others. A first meeting of the representatives of some of these committees was held under the auspices of the League of Nations early this year. As we have already stated, the exchange of views which took place was particularly fruitful. Those participating acquired information regarding the methods of nutritional investigation and education used in other countries which, in their opinion, will prove to be of great service to them in dealing with their own national problems. It therefore appears to us desirable that periodic meetings should be held, under the auspices of the League of Nations, of the representatives of the committees of countries whose nutrition problems are broadly similar in character.

60. We have already referred¹ to the contribution which the competent international organisations can make and are making to the study of various aspects of the nutrition problem; there is, in our view, scope for further fruitful collaboration between these organisations and the National Nutrition Committees. We desire here to draw attention to a few additional possibilities of effective collaboration. The first relates to the methods used in ascertaining the food-consumption habits of the various populations; we attach great importance to the improvement of these methods and to the securing of a higher degree of international uniformity.² The second relates to the collection of other data required by the National Nutrition Committees in order to develop a national nutrition policy. Such a policy must be based, not on generalities, but on specific foods, and must take account of the food-consumption

¹ See Chapter I, paragraphs 8, 10, 11, 19 to 24, 25, 26, 27, and also paragraphs 40, 54, 55 and 56 above.

² See Chapter I, paragraph 18.

habits and economic resources of the various peoples; it requires abundant information regarding, not only existing food-consumption habits, but also the nutritive values of different foods, nutritional requirements and food prices. It is our view that the competent organs of the League of Nations, in collaboration with the International Labour Office and the International Institute of Agriculture, could make a valuable contribution to the task of the National Committees by informing them of the methods successfully employed in the collection and analysis of this information. Finally, we would express the hope that, if the National Nutrition Committees publish periodic surveys of nutrition policy in their respective countries, the competent organs of the League of Nations will, from time to time, incorporate the information contained in these reports and other pertinent material from the several countries in a review designed to show the progress of nutrition policy in the various parts of the world.

* * *

In presenting this final report on the economic and agricultural aspects of the nutrition problem, we have discharged the duty laid upon us by the sixteenth and seventeenth Assemblies.

We have not attempted to provide ready-made solutions for a problem which is infinitely complex. As a result of our studies and discussions, we have been able to submit certain general principles for the consideration of Governments. The facts that we have adduced in this, our final report, confirm and, we venture to believe, substantiate the recommendations we put forward in our interim report; these recommendations are annexed hereto.

The malnutrition which exists in all countries is at once a challenge and an opportunity: a challenge to men's consciences and an opportunity to eradicate a social evil by methods which will increase economic prosperity.

* * *

RECOMMENDATIONS PUT FORWARD BY THE MIXED COMMITTEE
ON THE PROBLEM OF NUTRITION IN ITS INTERIM REPORT.

The Mixed Committee, while recognising the importance of the economic aspects of the nutrition problem, the fuller treatment of which it desires to reserve for a later report, submits to the Assembly the following preliminary recommendations, in the hope that, if they are approved by the Assembly and accepted by Governments, they will make a real contribution to the improvement of nutrition.

In order to promote endeavours to secure an adequate provision for all their people of necessary and, more especially, of protective foods, the Mixed Committee suggests to the Assembly to recommend that Governments should:

(1) Encourage and support in every possible way the further scientific study of nutrition problems with a view to ascertaining the optimum nutrition for each country, due consideration being given to differences of national economic structure, of climate and of available sources of supply;

(2) Take all appropriate measures to ensure that the latest information about nutrition is included in the teaching of medical students and that medical practitioners, medical officers of health, district nurses, etc., have such information constantly brought to their notice;

(3) Conduct a vigorous policy of education on popular nutrition for the instruction of the general public in this subject;

(4) Support the Health Organisation of the League of Nations, not only in the work of its technical committees, but also in its endeavours in the field of public health and preventive medicine to promote the application of modern nutritional science for the benefit of the different age and occupational groups of the population;

(5) Facilitate and promote international co-operation in education and propaganda and in the exchange of information, and, in particular, encourage all appropriate international organisations to lend their help;

(6) Consider what steps should be taken, whether at the public charge or otherwise, to meet the nutritional needs of the lower-income sections of the community, and, in particular, the means by which they might ensure that adequate supply of food, especially safe milk, should be made available for expectant and nursing mothers, infants, children and adolescents;

(7) Consider what further steps might be taken to meet the nutritional needs of adults, unemployed or otherwise in distress.

(8) With a view to giving the fullest possible effect to national propaganda and educational efforts for the improvement of popular nutrition:

Take all possible steps to make food supplies, and especially protective foods, so far as possible, available at prices within the reach of all classes of the community, while at the same time safeguarding the interests of the producers;

Take steps to improve and cheapen the marketing and distribution of foodstuffs in both industrial and rural districts, and, with these objects in view:

Encourage collaboration between co-operative and other forms of producers' and consumers' organisations;

(9) With a view to assuring purity of food and in the interest of public health, promote, so far as possible, the international unification of the technical analysis and control of foodstuffs, and of the control of preparations sold primarily for their vitamin content on the basis of the work being conducted on standardisation of biological products;

(10) Set up standards of reference and specifications for grading foods of all kinds according to quality;

(11) Consider whether any modification of their general economic and commercial policy is desirable in order to ensure adequate supplies of foodstuffs, and, in particular, to assist the reorientation of agricultural production necessary to satisfy the requirements of sound nutrition;

(12) Co-ordinate the work done by different authorities which affects the nutrition of the people and, in the absence of a central

authority, set up a special body for this purpose, in order to secure unity of policy and direction;

(13) In order, *inter alia*, to ascertain how far existing national dietaries fall short of the new standards of nutrition, collect information on food consumption by families of different occupational groups at different income levels as well as on the distribution of the population by family income;

(14) Consider to what extent and by what means their national statistics of the supply and consumption of individual foods might be improved;

(15) Assist the International Institute of Agriculture in collecting information regarding supply, national consumption and prices of foodstuffs.

* * *

Furthermore, the Mixed Committee invites the Assembly to recommend the Governments concerned to give their full support to the Health Organisation in its enquiries into the widespread malnutrition which exists in the tropics and certain Far-Eastern countries.

PART II.

Nutrition and Health.

NUTRITION AND HEALTH.

I. INTRODUCTION.

The progress made in medical science and hygiene in the second half of the nineteenth century led Governments to the realisation that great possibilities of improvement in national health were within the reach of mankind. The knowledge of the infective nature of many maladies indicated ways of stamping out epidemic disease. Means were discovered of making the human environment more healthy and of fortifying the body by physical training, which became increasingly popular. It was confidently hoped that the ancient ideal of *mens sana in corpore sano* would become the heritage of all human beings if the work thus begun was pursued further with devotion and enthusiasm.

But this very work has revealed the extent of the ills which it has to cure. In spite of the application of the knowledge of medicine and hygiene, the physical condition of a large part of the human race is still far below the accepted standard, and the more recent advances in medical science have established the fact that this inferiority is largely due to imperfect nutrition.

In the great war, nations which were obliged to enroll large numbers of very young soldiers were appalled at the poor quality of the recruits that were presented for service. Medical inspection of schools revealed then and still reveals a large number of sickly children below the normal standard of development for their age. The considerable decline in infant mortality in some countries only renders more impressive the persistence of high

infant mortality in others. Certain epidemics display a destructive power that seems due, not solely to the virulence of the infective agent, but also to a lack of resistance in the population attacked.

At the same time, the discoveries of the last thirty years leading to the "newer knowledge of nutrition" show with ever-increasing certainty that inadequate nutrition plays an important part in infant mortality and can account for the excessive proportion of under-developed school-children and adolescents and the poor health and small output of a large number of workers. Deficiencies in diet and diseases of nutritional origin can be observed, not only among urban populations, but also among dwellers in country districts, and not only in poor or primitive countries, but also in the rich nations with an old and highly developed civilisation.

Interest having thus been awakened as to the importance of correct nutrition for the public health, investigation of the existing conditions has spread to every quarter of the globe, the results of which have created the suspicion that a large part of humanity may be ill-fed or underfed.

2. THE PRINCIPLES OF CORRECT NUTRITION.

The diet must supply the necessary substances for the growth and repair of the organism and energy for the production of animal heat and muscular work. The organism being in some respects comparable to a heat-machine which converts fuel into calories, its energy requirements may be estimated in calories. The fuel or energy needs of the body are supplied by the fats, carbohydrates and proteins of the diet, the proteins having the additional function of building new tissue for the growing animal and of repairing tissue wastage in the adult. For these purposes, the proteins contained in animal foods are of better *quality* than those contained in foods of plant origin, the proteins of milk, eggs and glandular animal tissues (liver, kidney) being specially valuable. Foodstuffs rich in animal protein have sometimes been called body-building foods. The diet should contain a certain proportion of foods providing "good" protein, and it is usually held that about 50% of the protein in a diet should be of animal origin.

Recent nutritional research has stressed the great importance of other essential food elements, vitamins and minerals, which are also indispensable, though required in relatively small quantities.

Vitamins.

The vitamins, of which about ten have been differentiated, have been called food hormones,¹ the conception being that, in the economy of the body, they direct the correct utilisation of the other dietary elements. A long list of diseases, including rickets, osteomalacia,² beri-beri, pellagra, dental caries, scurvy, ophthalmia, are now known to be of nutritional origin and to be caused partly or wholly by deficiency of one or more of the vitamins. The vitamins have been extensively studied in the last twenty years, some have been isolated in the pure state, while, of the nature and function of others, knowledge is still very imperfect. The principal vitamins, all of which are necessary to promote growth and maintain health, have been classified as follows :

Vitamin A (fat-soluble). — Deficiency of vitamin A is manifested by impairment of vision, which, in a severe form, results in night blindness, and not infrequently in corneal ulcer, leading to blindness. Populations receiving inadequate vitamin A have a high incidence of kidney stones, bronchitis and other lung diseases, and impairment of function of the intestinal tract.

Vitamin B Complex (water-soluble). — Two components of this complex have been isolated from natural foods, and chemical studies have resulted in their synthesis. These are vitamin B₁ and lactoflavin.

Vitamin B₁ deficiency is the cause of beri-beri, which, among rice-eating peoples, constitutes a major health problem. The primary injury is to the nervous system. This vitamin is now being synthesised in a number of countries. It is noteworthy that physicians are reporting favourable response by many patients who suffer from poor appetite and neuritis following administration of this vitamin. This suggests that

¹ From a Greek word meaning "messenger". Hormones are thus chemical messengers.

² Osteomalacia is a disease in which the bones of adults become largely composed of osteoid tissue which contains very little calcium and is therefore soft. Great deformity of these bones may result.

even in a country with ample food resources, faulty selection of food may result in this specific form of malnutrition. There is strong evidence that human dietaries in many parts of the world are more or less deficient in vitamin B₁, although beri-beri is absent.

Lactoflavin is the greenish-yellow pigment in whey, and was first prepared in pure form from whey. It occurs in liver, kidney, yeast and in many yellow vegetable products. It has been synthesised in the laboratory. Lactoflavin is the chemical name for vitamin B₂. It is an indispensable nutrient since animals deprived of it sicken and die. The study of the effects of a deficiency of this substance has not progressed far enough to reveal much information concerning the nature of the physiological damage which occurs through its privation.

The remaining components of the B complex at present unidentified are concerned with the prevention of pellagra, and possibly sprue¹ and acrodynia,² and certain forms of anæmia.

Vitamin C (water-soluble). — This is necessary for prevention of scurvy. Although scurvy is now relatively rare, it is evident that sub-clinical scurvy is relatively common. The health of the blood vessels is greatly dependent upon an adequate supply of vitamin C, as are also the structures in the pulp cavity of the living tooth. It is shown that animals which have been somewhat depleted of their reserves of vitamin C, but not sufficiently to induce scurvy, are much more sensitive to injury by bacterial poisons produced during infections, than are animals whose body store of the vitamin is ample. Doses of bacterial poisons which are tolerated with impunity by animals with adequate reserves of vitamin C, cause injury to the arteries of animals with no reserves of this substance. Increased susceptibility to certain infections is also caused by depletion of the store of the vitamin in the tissues. It is used up much more rapidly during fever, as in tuberculosis, than under normal conditions of health. Every year, new

¹ Sprue is a disease associated with gastro-intestinal disorder, and is generally accompanied by anæmia.

² Acrodynia is a disease characterised by pricking pains and other disturbances of secretion in the palm of the hands and soles of the feet, associated with reddening of the skin.

evidence comes to light showing the importance of taking daily an adequate amount of vitamin C as a measure for safeguarding the health.

Vitamin D (fat-soluble). — This is required for correct utilisation of calcium salts and phosphates in the nutrition of the growing and adult skeleton, for prevention of rickets, osteomalacia¹ and dental disease. Vitamin D can be taken in the food (in egg-yolk or fish or liver oils) and is also synthesised in the skin by the action of certain of the sun's rays which, in temperate regions, are present only in summer, but are abundant and powerful in their action in tropical and Southern-European countries.

The nutritional diseases mentioned above are, except in the case of rickets, the outcome of long-continued severe deprivation of the vitamins in question. It is perhaps even more important to emphasise, however, that a less severe deprivation in time or extent or a partially inadequate intake of these essentials may involve ill-defined and disabling departures from health of which the causes may remain undiagnosed.

Minerals.

Recent researches have revealed the great importance of an adequate amount, and a correct balance, of essential minerals in the diet. Of these, calcium, phosphorus, iron and iodine have a special interest. Since a large proportion of the human body is composed of calcium phosphate, forming the skeleton and teeth, the need for ample supplies of calcium and phosphorus is self-evident. A smaller but necessary supply of iron is required for nutrition of blood elements and prevention of anæmia, and a minute provision of iodine is also necessary for the prevention of simple goitre or increase in size of the thyroid gland.

3. "ENERGY-BEARING" AND "PROTECTIVE" FOODS.

A useful division of foods into two classes has been made —(1) the protective foods, those chiefly valuable for providing minerals, vitamins and "good" protein, and (2) the non-

¹ See footnote, page 61.

NUTRITIVE VALUE OF FOODS.

Food	" Good " protein	Minerals	Vitamins			
			A	B	C	D
Milk	++	+++	+	+	+∅	+∅
Cheese	++	++	+	+	—	—
E Eggs.	++	++	+	++	—	++
E Liver	++	++	+	++	—	+
E Fat fish (herrings, etc.)	+		+	+	—	++
Green vegetables, salads	+	+++	+	+	++	—
Raw fruit, fruit juices		+++	+ *	+	++	—
E Butter	—	—	+	—	—	+∅
Cod-liver oil	—	—	+++	—	—	+++
Yeast	+	+	—	++	—	—
Meat (muscle)	+	⊥	—	+	⊥	—
Root vegetables, tubers			+ *	+	+	—
Legumes (dry peas, lentils)			—	+	—	—
E Cereals, bread (whole-meal)	+	⊥	⊥	+	—	—
E Cereals, bread (white)			—	—	—	—
E Cereals, rice (polished)			—	—	—	—
E Nuts	⊥		—	++	—	—
E Sugar, jam, honey.			—	—	—	—
E Margarine, olive oil and other vegetable oils			—	—	—	—

Highly protective foods

Less protective foods

Non-protective foods

E = foods of high energy or caloric value.
 +++ signifies very rich.
 ++ signifies rich.
 + signifies present.
 ⊥ signifies present in small amount or traces.
 — signifies absent.
 ∅ signifies in summer, when the cows are on pasture.
 * signifies if yellow in colour.

protective foods, chiefly valuable as energy-providers. Lack of calories causes starvation, lack of protective foods causes various "deficiency" diseases which may develop in spite of an abundant calorie intake.

The table given opposite contains a rough classification of some of the commoner types of foods into these two classes and shows their relative value as vehicles of energy, good protein, minerals and the more important vitamins.

Among the most important protective foods are the dairy products, especially milk. Then the glandular animal tissues (*e.g.*, liver) and eggs; "fat" fish, green vegetables and fresh fruit are also very rich in vitamins and minerals. Finally, there are certain fats (butter and cod-liver oil) of special value for providing vitamins A and D. Vitamin D, which is sparsely distributed in ordinary foodstuffs, is a vital necessity for young children living in temperate climates or in industrial regions where sunlight is scarce, especially in winter.

Among the prominent energy-giving foods are the fats, the cereals and sugar. The ordinary mixed diet should form a collection of protective and non-protective foods supplying the requisite energy for the body's activity and containing all the necessary protective elements in a correct balance. An unlimited number of different diets could be composed, all of which would satisfy this nutritional ideal. According to the variation in the food supply in different climates and under different circumstances, so the problems of correct nutrition will in practice be met by a large variety of different food combinations. The *principles* of correct nutrition, however, remain the same.

4. SPECIAL DIETARY NEEDS OF DIFFERENT CLASSES AND AGE-GROUPS.

Study of the incidence of nutritional disease has demonstrated the general principle that, where a specific dietary deficiency exists, evidence of its effects will be first apparent in those individuals who are subjected to special physical strain.

If the protective elements are adequate in a diet, the needs for support of extra manual work can easily be met by additional non-protective foods, such as fats and carbohydrates, from which

the additional energy can be obtained. Where the supply of protective elements is inadequate, physical strain will often make the defect manifest. Thus, in the history of arctic exploration, where the diet lacked the antiscorbutic elements, men performing hard manual work have frequently been the first to sicken of scurvy. In the East and West Indies, where the diet consists too exclusively of polished rice and is lacking in B vitamins, beri-beri frequently attacks expectant and nursing mothers as well as gangs of coolies performing heavy work. Where the diet is deficient in calcium salts and phosphates (as, for example, in Northern China and North-West India), it is chiefly the child-bearing women who suffer from osteomalacia¹, although the men are also affected if the deficiency is very severe. Special need for protective food arises in cases of expectant and nursing mothers, who have to perform extra nutritive functions in addition to nourishing their own bodies. Growing children also require an abundance to provide nourishment for their growing tissues and the younger the child the greater the need for the protective foods. In these cases, there is special need for an adequate mineral and vitamin supply and for "good" protein. The results of deficiency may remain latent for some length of time in a manner analogous to the incubation period of an infective disease of low virulence, such as tuberculosis. Malnutrition, especially in children, affects not only the physical health, but also the mental development. It is a great evil at all ages, but there are specially sensitive periods when the organism is growing; such are found in uterine life, in early childhood and in adolescence, when the ill-effects of faulty nutrition are much more serious and may even be irreparable.

(a) *Expectant and Nursing Mothers.*

There is good reason to believe that a large amount of sickness and disability associated with child-bearing, and the high mortality rates of pregnant women, could be substantially reduced by improved feeding of these women. During pregnancy and lactation, the mother has not only to be supplied with all the nutritional factors necessary for her own health, but has also

¹ See footnote, page 61.

to sustain the extra burden of having to provide many essential chemical substances for the development of the growing embryo and foetus. It is undoubted that many modern diets are deficient in certain chemical substances and bring about much ill-health to the mother as well as defective development and diminished resistance of the foetus and infant. One of the commonest defects in modern civilised diets is a faulty mineral supply leading to disordered calcium metabolism, so that the mother has to sacrifice the calcium salts of her own bones for the developing offspring. This deficiency may be so great as to result in osteomalacia, but, whereas this is rare in European countries, smaller defects in calcium metabolism are undoubtedly common. This is evident in the increased tendency to dental caries in women at these times. Other distressing complaints during pregnancy, which are apparently related to the defective calcium nutrition, include muscle soreness and weakness, and the consequent inability to perform ordinary daily activities, which is generally not relieved by rest during the day or on retiring at night; also, the inability to sit or lie long in one position, a condition often associated with intervals of more definite muscle spasm and contractions which may be quite severe. In an investigation made in America on 576 cases of pregnancy, 316 complained of symptoms of this nature. In almost all these cases, relief followed the administration of additional calcium and vitamin D.

In a Norwegian investigation, eleven women out of sixteen were found in a condition of negative calcium balance towards the end of pregnancy—that is to say, these women were losing more calcium from their body than was provided in their food, and this negative balance was made positive by increasing the daily calcium intake by providing them with about two pints of milk a day. Other sources of vitamin D, such as cod-liver oil or egg-yolk, were also effective in improving this condition.

Another substance which is likely to be deficient in the diet of pregnant women is iron, of which the maternal organism has to supply a relatively large quantity to the foetus. A large proportion of women of child-bearing age suffer from simple anæmia, and this condition is exaggerated by pregnancy and lactation. Thus, in an investigation made at a hospital in London,

rather more than 50% of nursing mothers had a hæmoglobin content of the blood of less than 80%. This common deficiency can be repaired either by giving iron salts in pregnancy or, better still, by giving foodstuffs rich in iron, such as meat, egg-yolk and vegetables.

It is well known that a deficiency of iodine in the diet of pregnant women may be of great significance. Only small quantities of iodine are necessary to supply the demands of the offspring at this time, but this minimum is essential to prevent prenatal abnormality of the thyroid gland, which predisposes the child to simple goitre, and, if sufficiently severe, to cretinism, and ordinary foodstuffs are so deficient in iodine that it is sometimes impossible to ensure even this small amount. In some countries in Central Europe, this difficulty is overcome by giving iodised salt in food—that is to say, sodium chloride containing 1 part of sodium iodide in 200,000 parts of sodium chloride. As regards natural foodstuffs, sea fish is the only rich source of iodine and, where procurable, this ought to be included in the diet of all pregnant women once or twice a week. Otherwise, it is essential to add iodised salt to the food. Japan is the only country which is free from goitre (about one case per million of population). This is due to its high consumption of foods of marine origin, all of which contain iodine.

There is evidence that vitamins are commonly deficient in the diet of pregnant women. The commonest deficiency is probably that of vitamin D; vitamins A and C are also ingested in deficient amount in many instances. These dietetic defects, except in the case of vitamin D, can be readily overcome by including such protective foods as milk, eggs, green and other vegetables and fruit in the diet. Where there is lack of sunshine, vitamin D can be provided in abundance in the form of cod-liver oil or of some preparation of the vitamin itself.

(b) *Infants.*

The importance of breast-feeding. — Complete breast-feeding of infants is of very great importance. It is cheaper, simpler and cleaner than artificial feeding and, in the case of a properly

fed mother, the benefits brought to the infant are great. Impressive evidence on this point was supplied by a large-scale enquiry reported from the Infant Welfare Centre of Chicago, in which 20,061 infants attending the centre between the years 1924-1929 were closely followed up for the first nine months of each infant life. Of these, 48.5% were wholly breast-fed, 43% partially breast-fed, and 8.5% wholly artificially fed. The artificial feeding was carried out on a definite plan, and all the infants—artificially fed and otherwise—were attended at intervals by the officials of the centre. The mortality rates of these different groups of infants were as follows :

	Number of infants	Total deaths	Percentage of deaths of infants
Wholly breast-fed	9,749	15	0.15
Partially	8,605	59	0.7
Artificially fed	1,707	144	8.4

It will be seen that the mortality rate among the artificially fed infants is fifty-six times greater than that among those completely breast-fed. The difference in the death-rate between these classes of infants was largely due to deaths following respiratory infections and, to a less degree, gastrointestinal and other infections. Thus, whereas only four out of 9,749 of the breast-fed infants died of respiratory infections, eighty-two out of the 1,707 artificially fed infants died from this cause.

No clearer evidence could be obtained to enforce the advantages of breast-feeding as compared with artificial feeding. Similar impressive evidence on the value of breast-feeding was afforded by the enquiry of the League of Nations into the causes of infant mortality in six European and four South-American countries, which also demonstrated the part played by bad feeding in infant mortality. Where this mortality was low, the digestive troubles usually caused by defective feeding were rare ; where it was high, digestive troubles were very prevalent—they were the outstanding cause of death, and it is by reducing them that mortality can be reduced. Conversely, where breast-feeding was general, the “ nutritional peril ” was usually small ; where artificial feeding predominated,

it was great. But, although the superiority of breast-feeding over artificial feeding with cow's milk has been demonstrated, breast-fed infants may yet be improperly nourished if, in addition to their mother's milk, they are given other untimely or unwholesome food, or do not receive the necessary vitamins in the form of supplementary foods.

The increased frequency of respiratory, gastro-intestinal and other infections in artificially fed infants and the resulting greater mortality can be ascribed to two causes. One is the " food peril " itself, which may be due to the infected milk of an artificial diet or to the irritating and indigestible nature of other constituents, and the other is the diminished degree of resistance to infection produced in infants fed on artificial diets as compared with those receiving mothers' milk. All milk which is given to bottle-fed infants should be boiled.

Common nutritional defects of infants. — The necessity for proper feeding of the nursing mother in order to allow the maintenance of her own health, to ensure the presence in her milk of a good supply of all the essentials for the infant's health and development, and even for the continuation of an abundant milk secretion, has been mentioned above. In breast-feeding under good conditions, the need for giving supplementary dietetic substances to the infant is diminished. In most cases, however, it is advisable to include cod-liver oil to supply additional vitamins A and D and iodine, and some form of vitamin C, such as orange juice. Where this is not available, the juice from grated raw potato, cabbage, carrots or turnips will serve equally well. Great care should be exercised that the vegetables be thoroughly washed, and the hands should be thoroughly clean before preparing the juice.

Infants at birth have an abundant supply of iron stored in their livers and, in the period of milk-feeding, these stores are gradually used up so that the hæmoglobin in the blood is reduced from 100% at birth to about 70% at the age of three months. This can be regarded as a physiological type of anæmia, as it occurs in practically all infants, both breast and artificially fed, although the fall is more severe and the recovery during subsequent months less in artificially fed than in breast-fed infants. The administration of iron to these infants will raise

the hæmoglobin level to 77% and upwards in the period from 5 to 12 months of age. In untreated infants, the hæmoglobin will generally drop from 70% at 5 or 6 months of age to 65% at 12 months of age. It has also been shown that the infants with low hæmoglobin in their blood have a much higher sickness rate due to infections than those receiving iron. The need for including iron-containing foods, such as egg-yolk or some form of iron itself, into the diet of infants over 6 months seems evident.

Even in the case of breast-fed infants, it may be desirable to give dietary supplements, but the need varies according to the climate. Thus, infants born in the tropics and exposed to much sunshine may need no extra vitamin D. Where infants are not so exposed it is of great importance that the diet should have a high calcifying value from birth onwards to ensure perfect calcification of the developing teeth and the proper growth of the jaws, preventing subsequent irregularities of the teeth. Such a diet will also prevent rickets and osteoporosis¹ and ensure the formation and growth of good bones.

In the case of the artificially fed infant, the inclusion of vitamin D and other specific protective substances is of much greater importance. Such infants ought always to be given cod-liver oil, orange juice, or some other product rich in vitamin C; also egg-yolk, because the common illnesses of infants, such as rickets, defective formation of teeth and anæmia, are much more frequently found in artificially fed than in breast-fed children, while gastric and respiratory infections in the former are much more likely to be severe and even fatal.

There is a common practice nowadays of including cereal and cereal products in the diet of young infants. The immediate effect of giving such foodstuffs is often apparently beneficial, as indicated by the increase in weight. The modern teaching of nutrition, however, is against giving cereals before 8 months or so, and even then only small amounts should be given. Many cereal products are very poor in vitamins and available mineral elements and their inclusion in the diet limits the intake of milk and other protective foods. There

¹ Osteoporosis is a condition of the bones in which the substance which gives them hardness—*i.e.*, calcium phosphate—diminishes. Such bones easily fracture.

is also evidence that they actually are harmful in the sense that they increase the demand for vitamins A and D and calcium and that their own calcium and phosphorus content are not available for the formation of bone in the growing organism under some circumstances. Thus a rapidly growing infant nourished with cereals is more liable to suffer from defects of calcification of the bones and teeth than one on a diet of milk and other protective foods only. It is probable also that the consumption of cereals by these young infants diminishes their resistance to broncho-pneumonia, intestinal and other infections.

The enquiry made by the League of Nations into the causes of infant mortality referred to above made it clear that the pernicious combination of poverty and ignorance was largely responsible for malnutrition in infancy, as, indeed, for that seen in other stages of human life.

(c) *Early Childhood, Pre-school Age, Nursery-school Age.*

As a rule, maternal and infant welfare institutions do not yet follow the child beyond the end of its second year, and there is consequently a gap in the health supervision between infancy and school age. Yet that is the time when malformations of the bones, dental defects and abnormalities of the pharynx appear. They will be discovered by the school medical officer, but it will then be too late to prevent and, in some cases, to remedy them. It is desirable to prevent these causes of chronic ill-health as far as possible by procuring improved feeding of children in these early years, both by extending the application of social services and infant welfare institutions forwards, or of the school medical services backwards to this age, and by increasing the knowledge and means of poor parents for better feeding of their offspring.

By the time children enter school, at the age of 5, large numbers show some form of physical defect and, although there is no proof that all of these defects could have been avoided by improved feeding, there is good evidence that many would not have developed under such conditions. In a recent

enquiry (1931) in London schools, it was revealed that, among children of 5 years of age, there were from 67% to 88% of cases of abnormalities of the bones, 67% to 82% (according to the gravity of the symptoms) of cases of adenoids, enlarged and septic tonsils, and other disorders of the pharynx, 88% to 93% having badly formed or decayed teeth. There is evidence that the defective bone formation and much of the dental decay among these children would have been avoided by the inclusion in their diet of large quantities of the protective foods, such as dairy products, and therefore less reliance upon bread and other cereals. How serious and widespread may be the defects in the feeding of children at this age can be seen in the following example : in 1921, in a city in the United States, out of 6,015 children of pre-school age, 90% were found to be receiving an inadequate diet according to current standards, 57% never received any fresh milk, 16% no milk of any kind, 59.5% no eggs, 60% practically no fruit, 50% no vegetable other than potatoes. As an aggravating circumstance, these dietary deficiencies were accompanied by a lack of proper rest or sleep. Is it any wonder that so many of the children beginning school life show physical defects and mental inactivity ?

It is just at this age that there is great need to maintain the resistance of children at the highest possible level against the ravages of the infectious diseases to which they will be exposed, such as measles and scarlet fever, and especially their sequelæ, broncho-pneumonia, middle-ear disease and nephritis. These diseases, if they do not kill, often leave the child with some chronic disorder which disables it for life. It is, for instance, at this age that deafness often has its starting-point owing to infection of the ear following measles and scarlet fever. Below the age of 3 years, measles is a particularly deadly disease, and there is suggestive but not conclusive evidence that the high mortality rate at this and older ages could be reduced by better nutrition of such children.

(d) *School Age.*

In the early years of school life, many children are already "damaged goods". They frequently show evidence of

previous defective feeding and lack of care in deformity of the bones of the limbs, chest and head, in bad dental structure often associated with decay, in deafness to a greater or less degree, in running ears, septic tonsils and adenoids, and in simple goitres. These indications of disease are not generally, however, from the present medical point of view, regarded as evidence of malnutrition and, indeed, there is no definite proof that some of them—*e.g.*, running ears, enlarged and septic tonsils—would have been prevented by proper feeding from early life, although this is probable. During the past fifteen years, the effectiveness of the provision of iodine in preventing goitre has been demonstrated on a large scale in several areas.

Malnutrition is usually diagnosed in school-children on the basis of subnormal growth and weight and general sickly appearance of the child. Nothing is more important than that a new attitude should be adopted towards this problem, for whereas such results of improper feeding as subnormal growth and weight and undefined general ill-health can usually be rapidly improved by better feeding conditions, the more chronic conditions due to earlier defective dieting cannot be so easily remedied, but continue to act as a handicap throughout life. The system of medical inspection of children that is now generally established under State control in different countries must be sadly handicapped so long as it has to deal with many children who come under its control from the beginning in a pathological state. Prevention rather than treatment of disease must be more and more emphatically stressed and, so far as this can be procured by better feeding, this ought to be done.

Even, however, on the present basis of diagnosis, there is abundant evidence of malnutrition in school-children. From 20 to 30% of school-children were found to be under-nourished in the poor quarters of Paris; in some cases, the only meal the children had during the day was that provided by the school canteen. Such cases are reported as frequent in Yugoslavia. In Poland, according to a recent estimate, 25% of school-children are ill-nourished in certain regions, 7% are threatened with tuberculosis, while additional meals should be given to at least 50% (according to documents received by the

Mixed Committee). In the United States, 7½ million school-children were under-nourished in 1933, according to a statement by the Secretary of Agriculture.

In 1917, according to specialists in rickets, nearly all the children of the negro population of New York were suffering from this disease; 83% in Connecticut in 1923; 43.4% in the villages in the north of Norway in 1931; 33 to 67% in two northern counties of Sweden. Rickets is still an important social disease in England, although the discovery of its ætiology and means of prevention is gradually causing its reduction. As regards dental caries, the enquiries carried out in various European countries have shown it to be present in from 50 to 95% of the children examined. In a recent enquiry undertaken in Norway, only 160 out of 25,000 school-children examined possessed perfect sets of teeth. According to the English report mentioned above, out of 3,303,983 children examined in 1933, 2,263,135 needed dental treatment. Dental caries frequently result in abscesses at the roots of the teeth. From these abscesses, disease-producing organisms frequently enter the blood and set up infectious processes in the joints, kidneys and other sites. Dental caries lays the foundation for much serious ill-health.

It is true that all these observations have not been based on uniform tests and that the state of ill-health of children likewise depends on other causes: sequelæ of previous infectious diseases, faulty hygiene in the home and inadequate amount of sleep and exercise in the open air.

So far as greater height and weight, muscular strength, general vitality and more vigorous activity are concerned, there is definite proof that much can be done by improved feeding of school-children. The evidence is of two kinds: first, derived from observations in which diets of school-children in boarding-schools have been constant over a period of years and then changed over a further period of years; and, secondly, from experiments in which milk or some other supplement has been added to the dietary over a period of months, and the effect of this change on the children noted. An example of the first of the experiments is seen in one English Public School, where the diet was closely controlled over the years 1913 to 1933. Between

the periods 1919-20 and 1928-29, there was a substantial increase in milk consumption, butter was substituted for vegetable margarine and there was a decreased consumption of bread. Associated with these changes in the diet, the average height of boys of 11 years of age increased from 4ft. 6.65in. to 4ft. 7.33in. and that of boys of 15 years of age increased from 5ft. 2.89in. to 5ft. 3.97in. There was a correspondingly large increase in weight of these children during the period of improved feeding. Curiously, two other improvements in general condition, probably due to increased milk consumption, were observed which are of great significance — namely, (a) a great decrease in fractures of bones in accidents, and (b) a decrease in rheumatism and rheumatic conditions.

The effect of adding milk and other supplements to the diet for a period of one year was, according to an English writer, equally dramatic in its action. A pint of milk added daily to what was considered a good diet in an institutional boarding-school caused in boys of 6 to 11 years old an increase of 2.63 inches in height and of 6.98 lb. in weight as compared with increases of only 1.84 inches and 3.85 lb. by similar boys who did not receive the supplement of milk. It was also remarked that there was much less illness among the extra-milk children, especially naso-pharyngeal catarrh, a reduced tendency to chilblains, a better condition of the skin, while the children were more alert and high-spirited. Burnet and Aykroyd have given accounts of other similar experiments on adding milk to the diet of school-children, and it may be taken as completely proved that the addition of milk to the diet of school-children would greatly increase their average height, weight, strength, vitality and general health.

Since school-children do not develop rickets or bone deformities, but only carry the stigma of earlier attacks of this disease, it is often assumed that they do not require so much milk to supply calcium as in earlier years. There is an element of truth in this idea, but only an element. The bones and teeth of school-children are growing and calcifying rapidly, and defective calcification of bones makes itself obvious by the ease with which they break. The frequency of bone fracture is a great social problem in some countries, especially in industrial

countries, and deserves more attention than it receives, and there is little doubt that this trouble would be greatly reduced by the consumption of larger quantities of milk and other protective foods.

Another important problem of child health is the tendency, during the school age, to contract acute rheumatism with its tragic associates, chorea, heart disease (rheumatic endocarditis), one of the commonest causes of chronic disability, ill-health and early death in some countries. If the greater consumption of protective foods can reduce these distressing conditions—and there is some suggestive evidence that it can do so—a great blessing would be conferred on mankind.

Compulsory education has been generally adopted throughout the civilised world. It is agreed that large numbers of school-children are not mentally or physically capable of profiting by this universally accepted recognition of the social obligation to educate the mind of every individual. Might it not be as well to make such children more physically and mentally fitted to benefit fully from these educational facilities by assuring that their nutritional needs are fully satisfied ?

(e) *Adolescence.*

The state of nutrition among adolescents is much less accurately known than among school-children. All authorities on the subject are, however, agreed that, under normal conditions of life, this is one of the most crucial periods. The rapid rate of growth of the adolescent makes abundant and efficient nutrition particularly important and yet this is a period when the State ceases to show a maternal interest in his physical well-being. There is evidence that, even in the case of boys and girls entering good employment at the age of 14 or 15 with reasonably good physique, they suffer much deterioration by the age of 18, a condition which is largely due to insufficient and unsuitable food eaten during this period.

This is the age when the most serious cases of pulmonary tuberculosis occur. Every tuberculosis specialist is convinced that the appearance of tuberculosis before the twentieth year is due to two main causes : overwork and malnutrition.

Although the general incidence of tuberculosis has been decreasing in many countries gradually during the past 100 years, and especially during the past thirty years, it is a distressing fact that this rate of reduction does not occur to the same extent in the case of adolescent and young adult people. Indeed, in young women there has been an increase in tuberculosis during recent years in some countries. This state of affairs has been ascribed by some to the modern habit of "slimming", by others to the greater expenditure dictated by modern habits of life on clothes, which leaves too little money for the purchase of proper food. Whatever may be the real explanation, it is undoubted that many adolescents in all countries, but particularly in industrial countries, are being improperly nourished at the present time and are suffering in consequence. Efforts of an educative nature ought to be taken to make adolescent boys and girls realise that the best health and the fullest physical and mental development is only possible if their dietary contains an abundance of the protective foodstuffs.

(f) *Young Soldiers.*

Military service claims young men at the end of adolescence, before they are fully mature. The rejection as unfit of a proportion of the men called up is not evidence that malnutrition is the only cause of their rejection, but military doctors do, in fact, assert, on their knowledge of the facts, that malnutrition is one of the main causes. In Belgium, as a result of the examination of 49,000 recruits in 1931, it was found that physical fitness had declined as compared with pre-war statistics, and among the causes (increase in school work, unemployment, excessive championship-hunting in sports), the defective feeding of children during the war and the increase in the incidence of diseases of the digestive tract are ranked first. In Denmark, a third of the recruits present a combination of symptoms known as "Danish disease" (flat feet, varicose veins, pains in the extremities and cramp in the calf of the leg). In Finland, notwithstanding the very high level of athletic attainments, 21% of recruits are rejected, and doctors attribute this to general

malnutrition among the poorer classes. In Poland, where there is a mass of evidence to show the vast extent of malnutrition, the proportion of recruits rejected is extremely high. It is a pity that the examination of recruits is not made more use of as a means of enquiry into malnutrition. How can we help being alarmed when we learn that, in the army of a large European nation, the proportion of men rejected for physical unfitness has risen, between 1923 and 1932, from 45.25 to 67.78 per thousand ?

(g) *Adults.*

Every fresh enquiry, in town or country, reveals either patent or latent malnutrition. ¹

The recent history of the high incidence of malnutrition among adults seems to be identified with that of unemployment. If unemployment has not augmented the evil of malnutrition to the extent that might have been expected, it is because malnutrition has been held in check by the development of Public Health Services. The effect of unemployment relief is reflected in an improvement in the diet of the unemployed. On the one hand, expenditure of energy and food requirements were diminished, and, on the other, when large-scale social organisations take care of the unemployed, the latter's diet, though less abundant, is often more rational.

It would be a mistake to believe that, generally speaking, unemployment produces no harmful effects. Its effects are to be sought, not so much among the adult unemployed as among their growing children. For more than two years now, in the United States of America, the Children's Bureau has been collecting information of different kinds from various sources which proves that the depression is having an increasingly bad effect on the nutrition and health of children. Thus, according

¹ In the United States of America, according to a recent communication from the Cost-of-living Division in the Ministry of Labor, of 209 families examined in the North-Atlantic States, 14 % were found to be undernourished "from every point of view". In Yugoslavia, the so-called "passive" regions, which produce neither wheat nor other vegetable foodstuffs, are suffering to a great extent from malnutrition owing to the exiguity of their purchasing power. Among certain classes of workers, wages are not sufficient to provide an adequate dietary, particularly when there are not enough wage-earning members of the family. In certain districts in Northern Sweden, where agricultural production is scanty and foodstuffs are scarce, a deficiency of vitamins has been observed. Cases of anæmia and scurvy are not infrequent.

to the New York City records, the percentage of school-children in a bad state of nutrition rose between 1929 and 1932 from 16 to 29 in Manhattan and from 13 to 23 in the Bronx. At Philadelphia, among young children under 6 years of age examined at the "Community Health Center", the figure rose from 11 (1928-1930) to 24 (in 1932).

The ravages caused by rickets, the most serious deficiency disease in countries of the temperate zone, have been described above in the section on children. It is in adult women, however, that one of the most serious disabilities of rickets becomes manifest, although the cause of the trouble has really started in the young and adolescent stages of life. The condition referred to is contracted or rickety pelvis, a defect frequently found in women in industrial centres. The small size and deformed shape of the pelvis in such women prevents the easy birth of the infant. A greater call on surgical interference is therefore made in child-birth under such circumstances, and this not only means greater distress to the mother, but also an increase in the liability of these women to puerperal fever, one of the commonest causes of death after child-birth. This is one of the best examples that can be given of the importance of prevention when dealing with a common and widespread disorder. The problem of the large number of deaths associated with child-birth is rousing much interest in some countries. Surely an essential point in any attempt to diminish this serious state of affairs is first to ensure fully developed and perfectly formed pelvis bones in child-bearing women by proper feeding of female children and adolescents. If this were attained, surgical help in child-birth would be much less needed and there would undoubtedly be a diminution in maternal mortality.

Another deficiency disease, pellagra, still plays havoc in temperate countries and causes 3,000 deaths a year in Roumania and 4,000 in the United States of America. If complete data were available, deficiency diseases, whether patent or latent, and their sequelæ, would probably be found to occupy a far more important place in the annals of malnutrition than at present appears. Certain diseases which were thought to have been stamped out or to have become very rare are again making their appearance. In connection with the privations caused by

the war, Danish doctors noted a sort of recrudescence of diseases of the eye caused by nutritional deficiencies, including a deficiency in vitamin A : thickening and opacification of the cornea, and weak vision, particularly at dawn and dusk. These symptoms would be detected more frequently if they were looked for more often.

There is considerable evidence of the influence of defective feeding on the tuberculosis death rate. The figures must be treated with caution, because in most cases other physical and mental causes are present, such as overcrowding, slums, overwork and worry. But no doctor who has had any experience of tuberculosis will deny the influence of diet upon the outset, progress and also the prevention and cure of this disease. Moreover, there have been, in the recent history of Europe, during and after the war, certain sad exceptional periods distinguished—unenviably—by food restrictions with which have coincided a very marked recrudescence of tuberculosis mortality : in the United Kingdom as from 1915, in the Netherlands as from 1916 and in French Flanders during the enemy occupation ; in Germany, during the war and during the inflation period of 1922-23. A few months after the cessation of the restrictions or blockade, the death rate fell to its pre-war figure. Generally speaking, it had been higher in the towns than in the country, because the country population could grow their own food and thus were not affected by some of the restrictions. In Denmark, the tuberculosis death rate, which had been steadily falling before the war, increased a little during the war as a result of food restrictions, although at that time there was no housing shortage. Subsequently, after the war, the tuberculosis death rate resumed its downward trend in spite of a prolonged housing shortage ; circumstances had dissociated two of the causes of tuberculosis mortality—housing and nutrition—and had demonstrated the outstanding importance of the latter.

Tuberculosis in industrial centres, although diminishing in incidence, is still one of the great killing diseases. It must also be remembered that, although this disease is being gradually reduced, the rate of reduction is much smaller in adults than it is in children. In fact, in dealing with adolescents, it was pointed out above that the incidence of tuberculosis in young women

(15-25) and to a less extent in young men has actually increased in some years during the past decade. Apart, however, from adolescence, the death rate due to tuberculosis in the adult is still very high, and it may be hoped that a wider adoption of the teachings of the present report by adults will bring about a substantial decrease in incidence, together with a corresponding fall in the death rate. Bronchitis, like tuberculosis, is a more deadly disease among poor people than among the well-to-do, in contrast to the greater frequency with which diabetes mellitus and appendicitis occurs among those with more money to spend. The position as regards the question of some relationship between bronchitis in the adult and malnourishment is similar to that of tuberculosis—that is to say, there is only suggestive, but not established, evidence of a direct correlation. Here again, therefore, it is possible that an increase in the consumption of protective foods, especially by poor people, would reduce the incidence and death rate due to this disease.

Though further enquiries will be necessary to establish the influence of certain given foodstuffs on human susceptibility or resistance to infection, there can be no doubt as to the general value of a proper diet in increasing resistance to disease.

5. THE MODERN SCIENCE OF NUTRITION AND THE LONDON REPORT. ¹

The New Science of Nutrition.

In determining human dietary standards, physiologists in the past have generally devoted their attention to minimum requirements. Such was the usual standpoint of Governments and administrations when called upon to fix the rations for bodies of workers, or to feed large masses of soldiers and civilians in war, or when obliged to assist the unemployed and their families during the time of industrial depression.

The idea of an *optimum* diet, on the other hand, has been developed and brought into pre-eminence by modern science.

¹ The London Report on "The Physiological Bases of Nutrition" by the Technical Commission of the Health Committee in November 1935. It was subsequently revised and amplified and reproduced as Volume II of the interim report of the Mixed Committee on Nutrition (1936).

An optimum diet is one which provides for the full development of the individual for efficiency without exhaustion and for his resistance to disease.

The standard for adequate nutrition, like the standard for hygiene in general, cannot be limited to that required for the prevention of avoidable diseases by means of a minimum or barely adequate diet; the business of adequate nutrition is to create health by means of the optimum diet.

Many of the well-recognised vitamin-deficiency diseases—such as scurvy, rickets, beri-beri, pellagra—are caused by severe, prolonged deficiency of one or other of the essential protective vitamins. Except for rickets, they are, fortunately, of relatively rare occurrence in temperate regions, and their full manifestation can usually be prevented by a minimal intake of the appropriate preventive factors. Much more common are the latent states of malnutrition, which may give rise to no visible disease—states which might be called pre-scurvy, pre-rickets and pre-osteoporosis, pre-pellagra, pre-beri-beri, pre-caries or the formation of teeth of imperfect architecture. The opportunity that lies before the science of preventive nutritional medicine rests upon the knowledge that these states exist and upon the proof of the necessity for striving after *optimum* nutrition rather than *minimum* nutrition.

In this connection, it has been observed that nutritional research will exercise a greater influence in preventive medicine by increasing the vitality of the human species, with all that that implies, than by preventing the frank “deficiency diseases”. The importance of this fact has not yet been fully recognised. The health of the individual, in the majority of cases, is destroyed, not so often by severe attacks of illness (which are more in the nature of accidents), as by the gradual action of persistent but unrecognised causes, of which one of the most important is a badly composed dietary. This is one cause of inferior physical development and nervous instability, of lack of recuperative power and endurance, and consequently of cumulative fatigue and lack of resistance to tuberculosis and other infections. Moreover, the diet largely influences the rate at which the organism ages and consequently the duration of life.

Preventive action against such nutritional diseases as scurvy, rickets and beri-beri, although superficially more impressive, is probably of less importance to the human race than the acquisition and application of such knowledge as will also improve the general condition and well-being of every man, woman and child, through the better choice, provision and utilisation of foodstuffs.

Such are the principles underlying the work of the Commission of Physiologists appointed by the Health Committee which held its first session in London at the end of November 1935.

6. DIETARY STANDARDS ADOPTED IN THE LONDON REPORT.

The Assembly resolution of 1935 recommended that the technical organisations of the League should make a study of nutrition in its relation to public health, labour, agriculture, trade and social progress. The basis of this work being the science of nutrition, it was necessary to obtain a pronouncement from nutritional experts as to the nutritional needs of the human being in the course of its development, from conception to the adult age. This pronouncement is contained in the report of the London Commission.

The question of human nutritional requirements has been under the close consideration of physiologists during the last three-quarters of a century, their conclusions being based either : (1) on the average spontaneous consumption of population groups ; (2) on statistics of food production and food imports and exports for a nation or a city ; or (3) on direct experiment with calorimetry on animals and human beings. The answers given by the scientists are matters of importance for public health, labour, agriculture, trade and public and private finance, and have been both numerous and varied. This circumstance has been a matter of amusement at times to the layman, but a source of anxiety and difficulty to the medical men and administrators who have to prescribe for individuals and to feed communities and masses of the population. Opinions regarding the necessary number of calories

follow two tendencies : one towards the maximum and the other towards the minimum requirements.

In the report of the Technical Commission, the two aspects of nutrition, the quantitative and qualitative, and the fundamental importance of protective foods, are brought out by the division of the report into two parts : I—dealing with energy, protein and fat requirements ; II—dealing with mineral and vitamin requirements. In both parts, the dominant idea is the needs of the human being during development. At the beginning of life, the child is inseparable from the mother, and additions, not only of energy, but also of protein and of all protective elements, are prescribed for pregnant women, nursing mothers, infants, children and adolescents.

(a) *Energy Requirements.*

The human race is not made up of arithmetical units, but of adults, adolescents and children of both sexes ; of childless women, pregnant women and nursing mothers ; of workers both manual and sedentary, and of idlers. If the ration for an adult male (and, even so, what type of male adult is meant ?) is taken as unity, what is the proper fraction for a woman, or for a child at different ages, or for an adolescent at different stages of growth ? In other words, what coefficient is to be used for conversion of the standard to the appropriate figures for each class ? There are in existence a score of scales of coefficients among which physiologists and hygienists can choose. The need is now felt, however, for a common scale which will allow of uniformity in national and international comparisons. The question was considered by the Rome Conference of Experts (1932), but only a provisional solution was reached. The questions of the standard calorie ration for the male adult and of the scale of coefficients were therefore dealt with at the London meeting.

Instead of adopting a mean figure representing the needs of an adult man performing an average but indeterminate output of work, the Commission fixed a basic figure representing

the requirement for maintenance to which supplements are to be added for work, growth, pregnancy and lactation. This basic figure represents the need of the average adult, male or female, living an ordinary everyday life in a temperate climate and not engaged in manual work. The needs of such an adult are stated to be met by 2,400 calories *net* (*i.e.*, after deducting waste in cooking and at table) per day. Most authorities have agreed upon this figure for the type of adult under consideration; and it so happens that the figure is convenient for calculation on a basis of 100 calories per hour. Conditions and age being equal, no difference is made between the sexes.

As the amount of muscular effort varies with the occupation and the number of hours of work, it is convenient to calculate the supplements on an hourly basis. Four grades of work are distinguished—light, moderate, hard and very hard—within which it will be possible for hygienists and engineers to place any given form of work.

(b) *Protective Foods, Mineral and Vitamin Requirements.*

In Part II of the London report, stress is laid on the need for protective foods. These are expressed in everyday terms as milk, butter, cheese, eggs, meat, potatoes, fresh green vegetables and fresh fruit. Sunlight is also reckoned as a protective nutritional agent, because it generates vitamin D in the organism.

Milk.

The need for milk in the human dietary. — The use of the milk of cows and other mammals in the diet of the human race is as old as the history of mankind, and during the long ages in which it has been thus used its value has ever been highly esteemed. A land “flowing with milk” was the ideal of pastoral tribes in ancient times and will still remain the ideal, if the correct nutrition and health of the people receive due consideration.

The value of milk is well demonstrated by a survey of the dietary habits of the different native races inhabiting the world.

Fine physique, good health and virility are usually seen in races where milk has an important place in the diet, as, for example, amongst the Arabs and other races inhabiting South-Western Asia and South-Eastern Europe. The contrast in health, strength and stamina is proverbial between the Hill tribes of India, who partake largely of milk, and those dwelling in the plains, where the diet is more exclusively vegetarian and consists largely of cereals.

Modern scientific research has entirely confirmed the empirical conclusions drawn from human experience as to the dietary value of milk. Milk, which is designed to afford complete nutrition to the mammalian young, is known to contain all the factors needed for satisfactory nutrition, combined in a suitably proportioned mixture of :

- (1) Protein of good quality,
- (2) Fat,
- (3) Carbohydrate,
- (4) Mineral salts,
- (5) Vitamins.

In this respect, *milk is the nearest approach we possess to a perfect and complete food, and no other single food is known that can be used as a substitute.* If this had not been so, milk would long ago have disappeared from the dietary of civilised peoples, especially of those dwelling in cities. For milk is not only the most *nutritious*, but is also the most *inconvenient*, and at times may be a *dangerous* foodstuff. For its high nutritive value makes it also a perfect medium for the growth of other organisms, including bacteria. In other words, milk will not “keep”, and an elaborate organisation is needed to bring it regularly to the consumer in a fresh condition. Apart from the bacteria concerned with the “natural” processes of souring and putrefaction, milk may also act as a vehicle for the spread of the germs of definite disease, such as tuberculosis, diphtheria, typhoid and scarlet fevers. The reason why, in spite of these drawbacks, we continue to include milk in our diet is because *its value is unique.* Evaporated milk, dried whole milk and dried skim milk are more economical than fresh milk and have been found extremely

useful in areas with inadequate dairy herds, where the quality of the fresh milk used in their production has been properly safeguarded.

It is true that it is possible to secure a fully adequate diet except in infants and young children without the inclusion of milk. This is shown, among other examples, by the physical perfection of the peoples of certain islands of the Pacific when they lived under primitive conditions. They ate a wide variety of vegetable foods, supplemented with fish, turtles, shell-fish, etc. But such foods as were available to them are not available to people subsisting on the agricultural products of Europe and the Americas. In these geographical areas, the products designated as protective foods must be made available in greater abundance for the protection of health.

Another reason why the importance of milk is stressed for these populations is that milk production on a large scale is economically sound in large areas, not only because of its unique value as a food, but also because dairying conserves soil fertility to a greater degree than does most other types of agriculture.

The nutritive value of milk. — (i) The *proteins* contained in milk, lactalbumin and casein, possess a high nutritive value, since the amino-acids of which they are composed make them especially suited to supply the requirements of growth in the young, as well as of maintenance in the adult.

(ii) *The carbohydrate* is present in milk in a soluble form, as milk-sugar.

(iii) *The fats* of milk are present in an emulsion of different fats of low melting-point. Milk-fat, when separated as butter, is the most digestible and acceptable fat known to us and is a source of the vitamins A and D.

(iv) *Minerals*: cow's milk is one of the foods richest in salts, especially in calcium salts and phosphates. These two *minerals* are essential constituents of every cell in the body, so that an adequate supply is necessary for the maintenance of health at all ages. The amount of lime in cow's milk (1.5—2 parts per 1,000) is only equalled by that contained in some green

vegetables. In milk, however, the lime salts are present in a form specially easy of absorption.

(v) *Vitamins*: while the nutritive value of cow's milk depends to some extent on the diet and management of the cow, yet the nature and proportion of the protein, carbohydrate, fat and salts it contains are maintained with remarkable constancy over a wide range of variation in the type of feeding adopted. There is, however, more variation in the vitamin content, and the highest value in this respect is only found in the milk of cows which are exposed to the rays of the sun and fed on their natural diet of fresh green herbage—*i.e.*, on pasture in the summer; nevertheless, winter milk remains a valuable foodstuff in this respect. It is true that the amount of the antirachitic vitamin D, so essential for the growing child, is much reduced in winter milk.

Vitamin D, however, whose physiological function is to secure the retention in the body of the lime salts and phosphates ingested in the food, acts with much greater economy when these salts are present in abundance in the diet. In many climates in the winter, therefore, when, owing to the lack of sunshine, the growing child is unable to synthesise vitamin D for itself, an abundant supply of milk is specially needed, for the salts thus supplied will enhance the action of the diminished amount of vitamin D present in the milk and other articles of food.

The composition of the proteins of milk makes them specially adapted for the support of growth in young organisms and gives them a definite supplementary action towards those of cereals, which are inferior in nutritive value. Milk, it is recommended, should represent a large proportion of the diet at every age. The report of the Technical Commission approved the tendency displayed in certain countries to increase the consumption of milk to as much as one litre per day for pregnant women and nursing mothers, and to provide a comparatively large quantity for infants, children and adolescents. For these classes, it strongly recommends free or cheap milk distribution. It calls attention to the nutritive value of *skim milk*, which, although it has lost its fat and fat-soluble vitamins, retains many other valuable nutrients. It therefore deplores the way in which this

valuable food is wasted in many countries. Of other milk products, *cheese* retains the proteins of milk, a large proportion of the calcium salts and vitamins, while *butter* is the most nutritious fat in the modern dietary.

Eggs.

Eggs are important as a source of good protein and of valuable minerals, including iron; the fat contained in the yolk is a rich source of most vitamins, especially of the B vitamins, also of the antirachitic vitamin D, which is otherwise sparsely distributed in foodstuffs.

Meat.

Meat has a special value as a source of protein and iron. Its popularity is chiefly due to its appetising and stimulating properties; but, from the nutritional point of view, the protein of ordinary muscle meat is inferior to that of eggs or milk. The glandular tissues, on the other hand—liver, kidney, sweetbread (pancreas)—are among the most highly nutritious foods we possess, as regards the character of the protein, the mineral and vitamin content. They are also rich in a substance which stimulates the formation of red blood-cells in the bone marrow.

Green and Leafy Vegetables.

Green leafy vegetables are rich in the B vitamins and in vitamin A; they are also among the richest sources of the antiscorbutic vitamin C. Since this vitamin is sensitive to heat, the dietary value of uncooked salads is obvious.

The abundance of minerals and vitamins in green vegetables and the special character of the protein, although present in small quantities, make them of great value, especially as supplementary foods to a diet containing cereals. Just as among pastoral communities the defects of a cereal diet may be corrected with milk and dairy products, so, under other circumstances, correction can be obtained by green vegetables. In the densely populated regions of Southern China, for example, where animal foods cannot be raised, the deficiencies of the rice diet are largely repaired by the abundance of vegetables eaten.

Fruit.

The special nutritive value of fruit depends on high vitamin C (ascorbic acid) content. Different fruits vary greatly in their vitamin C content, the richest being citrus fruits (*e.g.*, oranges and lemons). Tomatoes are also valuable : grapes are relatively poor.

Vitamin C is readily destroyed by heat, so that fruit jams and preserves usually contain none. It is probable that preserved fruits, however, may possess a dietary value due to their mineral content. Oranges, again, are rich in calcium salts, while grapes are rich in iron, and fruits generally may have a special value in supplying mineral constituents to those on otherwise restricted diets. Fruits having a yellow colour—*e.g.*, oranges and tomatoes—are often useful sources of vitamin A owing to their carotene content.

Cod-liver Oil and Other Fish-liver Oils.

The importance of cod-liver oil was stressed in the report of the Technical Commission as a source of vitamin D for infants and growing children, especially for those living under climatic, seasonal and social conditions where sunshine is limited. It is also a valuable source of iodine and vitamin A. Cod-liver oil contains 85 to 100 international units of vitamin D per gramme. The liver oils of the halibut, tuna and of the percomorph fishes (of which the perch is the common type) contain extraordinary quantities of the vitamin. The percomorph liver oils contain as high as 100,000 I.U. per gramme. Although these oils are much less abundant than cod-liver oil, their high potency in vitamin D makes them effective in very small doses, and they are important sources of this nutritive factor.

(c) *Energy-bearing Foods.*

The report of the Technical Commission sets out some specimen diets for various age-groups up to the age of 5 years and for mothers. In these, the report so arranged the protective foods as to yield approximately 1,400 calories per head without the

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inclusion of any cereals, fats or sugar. These would have to be added as required to satisfy the energy requirements of any individual, as distinct from his essential mineral and vitamin requirements.

In the general recommendations in its report, the Technical Commission emphasised the following views :

“ Although a simplified diet may be so constituted from a few protective foods as to be satisfactory, it is a general principle that variety in diet tends to safety, provided it contains a sufficiency of the protective types of food materials.”

“ White flour in the process of milling is deprived of important nutritive elements. Its use should be decreased and partial substitution by lightly milled cereals, and especially by potatoes, is recommended. The consumption of an excessive amount of sugar is to be condemned, and in this case also partial replacement by potatoes is urged.”

It will be noted that the report of the Technical Commission recommends the modification in many countries of the proportions hitherto occupied in dietaries by the three foods named.

Cereals.

Cereals form a most convenient and acceptable food of high energy value and for centuries they have been the staple food of the great Asiatic and Mediterranean civilisations. Their value is self-evident ; but, in Europe especially, partly because of the increased availability of protective foods, their consumption has tended to diminish, except under conditions of heavy manual labour or because of limitations in income. At the same time, cereals are being consumed more and more widely in a highly milled form. The report suggests that bread should be made more protective by restoring to the flour, as far as possible, the special nutritive principles contained in the husk and germ of the grain, particularly the vitamin B group. This recommendation, issued at a moment when the question of

different kinds of bread is being discussed in every European country, is of great importance both for economic as well as for hygienic reasons.

Sugar.

In the last thirty years, sugar has become one of the cheapest forms of calories and the consumption has increased manifold in many European countries, especially among the poorer sections of the populations. In the United Kingdom, it has been estimated that a fivefold increase in average consumption has taken place during the last hundred years. Refined sugar, like highly milled cereal products, provides energy without any protective elements. An excessive proportion of sugar in the diet is especially bad for children, whose instinct to eat it seems altogether out of proportion to its nutritional qualities, since it occupies the place which should be filled by protective foods.

Potatoes.

Special attention is called to the value of the potato as a food rich in calories and in starch and is particularly suited to substitute sugar and cereals in the modern European diet. The introduction of sugar and white flour to populations in remote districts has been followed by the occurrence of dental disease previously unknown. Examples are found among the inhabitants of Iceland, among Esquimo and native Indian tribes in Alaska and Western Canada and among the races inhabiting Northern Scandinavia. A large proportion of potatoes in the diet encourages no such predisposition to dental disease as is the case with cereals; populations showing relative freedom from dental disease with high consumption of potatoes are found in certain islands of the Hebrides, in rural Finland and in Poland, and in Tristan da Cunha, in which island at the present time potatoes form a large proportion of the dietary, and dental caries is a rarity. Potatoes are also a valuable source of iron and vitamin C, and one of particular value, because they retain a high proportion of their vitamin C content after cooking.

PART III.

- Chapter 1. — Recent Trends in Food Habits.**
- 2. — Agriculture and Nutrition.**
- 3. — Food Prices and Consumption.**
- 4. — Factors influencing Food Prices.**
- 5. — The Relation of Income to Nutrition.**
- 6. — The Relation of Education to Nutrition.**
- 7. — Evidence of Malnutrition in Certain Countries.**

Chapter 1.

RECENT TRENDS IN FOOD HABITS.

A. INTRODUCTORY.

1. The remarkable progress made during the past century in transport, refrigeration and finance has greatly influenced the dietary habits of Western peoples. Before these developments, the nature of the diet was of necessity determined mainly by local resources, being largely animal in pastoral communities and becoming increasingly vegetarian with the development of tillage. There were marked seasonal variations in human food consumption. As a result of the technical revolution in transport and the development of international trade, the diet of all peoples became more diversified, adequate and stable.

2. With the progress of science, the influence of national conditions has played a continually smaller rôle. The application of science to agriculture in the course of the nineteenth century resulted at once in the extension of the cultivation of food crops to new areas and in more intensive exploitation—greater yields per acre and per beast—and an increase and improvement in varieties produced. At the same time, methods of handling and preparing foods were improved.

3. In consequence of these changes, the character of the food problem itself was altered. Throughout many parts of the world, it practically ceased to be a problem of hunger and became rather a problem of nutrition. It is, of course, impossible to say exactly when this transition occurred; the process was gradual and imperceptible. It is, however, sufficient to compare our present preoccupations about the qualitative adequacy of diets (their animal protein, vitamin and mineral content) with the famines which decimated whole communities even as late as the first half of the nineteenth century, to realise the enormous progress that has taken place.

4. These technical advances have been accompanied by a change, perhaps as revolutionary in nature, in the science of

nutrition. The importance of *rational* feeding in building the bones, teeth and body in general as well as in maintaining good health has been brought into the foreground of scientific discussion. New criteria of food values have been set up; a beginning has been made in popularising the new knowledge; and the selection of foods on the basis of the new criteria has become a matter of public concern.

5. Until the scientific discoveries of the past fifty years which led to the development of "the new science of nutrition", the food problem was regarded as primarily a quantitative one. Stress was laid chiefly on the energy requirements of the body, supplied by the fats, the carbohydrates and the proteins of the diet.

6. The new science of nutrition adds much to the older teachings, but it does not supplant them. Cereals and other energy-bearing foods retain the important place in human nutrition formerly attributed to them. The modern science attaches special importance, however, to the necessity for supplementing diets which are largely based on the energy-bearing foods with adequate amounts of the so-called "protective" foods—a term originally coined by a member of the Mixed Committee¹ to designate certain foods particularly rich in vitamins and mineral salts. The protective foods on which special emphasis is laid are milk and its derivatives, including butter; green vegetables; fruit; eggs; glandular tissues; fat fish; and, for certain sections of the community, muscle meat. Cereals, sugar and certain fats other than butter are important chiefly as sources of energy. This classification of foods is, of course, general. The protective foods on which stress will be laid in any particular country necessarily depends upon food-consumption habits, local resources, etc.²

* * *

7. Governments, in considering their nutrition policies, will no doubt wish to know whether the changes recommended by modern physiology involve revolutionary disturbances in food

¹ Dr. E. V. McCOLLUM in "The Newer Knowledge of Nutrition" (4th Edition, New York, 1929).

² See also League of Nations: "The Problem of Nutrition", Vol. II — "Report on the Physiological Bases of Nutrition, established by the Technical Commission of the Health Committee" (Geneva, 1936).

habits or whether, on the other hand, their populations have already been tending to change their consumption in the required direction. Moreover, it is necessary to consider the power of agriculture to adjust itself to such changes in the demand for food as may result from encouraging the movement towards better nutrition. For these reasons, it has been thought convenient to trace the changes which have taken place in food habits since the technical changes referred to above began to exercise a real influence on diet, and, in the second place, to examine the part that agriculture has played in connection with these changes in food consumption. This historical survey should enable us to set the present movement towards better nutrition in its proper perspective: to show that ground has already been gained before setting out what remains to be accomplished; to show what changes in agriculture have already taken place before considering what changes may in the future be required; and to indicate what has helped and what has hindered the movement in the past before making suggestions as regards the future.

B. TRENDS IN THE CONSUMPTION OF VARIOUS GROUPS OF FOOD.

8. In default of adequate statistical material, the analysis which follows must be illustrative rather than exhaustive. For the same reason, it deals mainly with Western countries.

9. It will be shown in subsequent paragraphs that the improvement in the dietary of Western nations which has taken place during the past generation has involved, as counterpart to the increased consumption of certain protective foods, a reduction in the *per caput* consumption of certain foods valued mainly for their energy-producing qualities, notably the cereals. This fact has, not unnaturally, caused some concern in certain agricultural circles, who fear that, as a result of the development of the movement towards better nutrition and the increase in consumption of the protective foods, there will be a continuous shrinkage in the demand for cereals.

The Mixed Committee has examined this question at some length and has come to the conclusion that an all-round improvement in nutritional standards would result in a considerable increase in the total world demand for high-grade cereals, and this for several

reasons. As has already been stated in paragraph 6 above, the energy-bearing foods remain the basis of the dietary: as nutrition improves, these will be supplemented and by no means displaced by the protective foods. Moreover, it is clear that the first and most urgent aim of nutrition policy must be to do away with under-nourishment in the absolute sense—*i.e.*, deficiency of calories—where it exists; this unquestionably involves increased consumption by a considerable number of people in various countries of the foods of high energy value, notably cereals. It is a well-established fact that persons suffering from a serious deficiency of calories are not able to derive full benefit from the high nutritive properties of the protective foods. Furthermore, in certain Far-Eastern and other countries, a qualitative improvement in diet would probably take the form, in the first instance, of the substitution of a cereal more compatible with health, such as wheat, for those of lower nutritive value, such as maize and rice. In view of the large populations and the extent of under-nourishment in these countries, this factor may be expected to play an important rôle in the development of the demand for higher-grade cereals as purchasing power gradually increases. Finally, in so far as improved nutrition in Western countries entails a greater consumption of foods of animal origin, it also involves an increased demand for cereals for use as animal feeding-stuffs.

·10. These considerations should be borne in mind in reading the paragraphs which follow, and, in particular, it should not be supposed that, because a reduced *per caput* consumption of certain foods has resulted from the improvement in consumption habits in certain classes in some countries, the total demand for these foods would fall with a worldwide improvement in nutritional standards.

Cereals.

11. Cereals constitute the principal source of energy in the world's diet and for centuries have been the staple food of the great Asiatic and Mediterranean civilisation.¹ The relative importance of the different cereals in the various parts of the world depends upon conditions determining production, on price, purchasing power,

¹ See F. C. KELLY: "Wheat", a report prepared for the Wheat Advisory Committee (mimeographed, London, 1936).

custom and taste. In Asia, rice remains, along with millet, the basis of the diet; yield in calories per acre is high and rice is the preferred cereal of the population. Elsewhere, wheat has gradually gained supremacy. Wheat, at one time the bread only of the wealthy, has been increasingly demanded by the lower-income groups of the population as their standard of living improved. It has replaced coarse grains, such as rye, oats and barley.

In the United Kingdom, this change was fully effected in the nineteenth century; in most other Western countries, it began later than in the United Kingdom and was effected more gradually. It was, of course, hastened by the import of cheap wheat in large quantities from non-European countries in the last quarter of the nineteenth century and by the introduction of new and more productive methods of cultivation in Europe to meet this competition. These developments not only caused a shift from other cereals to wheat, but also released purchasing-power for increased consumption of other foods. To-day the trend in Europe is almost universally away from the other cereals to wheat, but rye is still important in a group of countries in Central, Eastern and North-Eastern Europe (Germany, Austria, Czechoslovakia, Poland, the Scandinavian and the Baltic States) and maize is extensively used in certain countries of South-Eastern Europe (particularly Yugoslavia and Roumania) and in parts of the United States of America.

12. The Food Research Institute of Stanford University has made the following estimate of post-war changes in the *per caput* utilisation of the three principal food cereals in the world as a whole, excluding Russia:

Table I.

"WORLD" *Per Caput* UTILISATION OF PRINCIPAL BREAD CEREALS 1909-1914 AND 1923-1933.^a

	Kilogrammes		Change	
	1909/10 to 1913/14	1923/24 to 1932/33	Units	Percentages
Wheat	97.16	93.62	— 3.54	— 3.6
Rye	30.21	23.95	— 6.26	— 20.7
Rice	49.26	42.73	— 6.53	— 13.3
Total	176.63	160.30	— 16.33	— 9.2

^a Taken from "Wheat Studies of the Food Research Institute", Vol. XII, No. 10: "World Wheat Utilisation since 1885/86", by M. K. BENNETT (Stanford University, California, 1936). Figures are given in bushels of 60 lb. in the original; converted into kilogrammes at the rate of 1 lb. = 0.4536 kg. (1 kg. = 2.2 lb.).

The figures refer to total utilisation, including seed and animal feed as well as human food. The compiler of the figures is of opinion that the *per caput* animal-feed use of wheat and rye together "almost certainly increased between pre-war and post-war years", while *per caput* seed use cannot have changed appreciably; he estimates that the fall in the world average *per caput* human-food use of all three cereals may well have exceeded 10%.

13. Many reasons go to explain this decline in the average *per caput* food use of cereals in post-war years. The most important is undoubtedly the general rise in the standard of living. Cereals are a relatively cheap food, and as incomes rise they tend to be replaced in the diet by more expensive foods:¹ the net result is a greater diversification in the diet. Propaganda favouring greater consumption of the so-called "protective" foods has been another influence operating in the same direction. With the increasing mechanisation of industry, less muscular energy is expended and the need for concentrated foods of high energy value has been reduced. Moreover, as will be shown in detail below, sugar has directly and successfully competed with cereals as a source of energy. Other commodities (for example, milk and fats) have competed indirectly; and the ordinary bread in use in some Western countries now contains a higher proportion of milk and of fats, as well as of sugar, than was the case a generation ago.

14. The absolute decline in the food use of bread cereals would appear to have been greatest in the countries where the great bulk of the cereal consumption consists of wheat. These are, in general, the countries with the highest levels of living; as incomes rose, there was a partial substitution of more expensive non-cereal foods for wheat. In countries where rye or maize was the principal cereal, there has, on the other hand, been a tendency towards their displacement by wheat. The relative importance of cereals and of wheat in the national diet of certain countries before the war is illustrated in the following table:

¹ For detailed evidence on this point, see Diagram II in Chapter 5 below.

Table II.

WHEAT AND OTHER CEREALS IN DIET OF CERTAIN COUNTRIES
BEFORE THE WAR.^a

Country	Percentage of total calories derived from cereals	Percentage of total calories derived from wheat	Percentage of wheat in total cereals
United States	34	26	75
United Kingdom	35	31	89
Germany	39	16	40
France	55	50	91
Italy	64	47	73
Russia	73	19	26
Japan	87	6	7

^a Figures apply to the years just before the war and were secured from compilations carried out during the war, largely for the purpose of determining the basis of rationing. Data are taken from "Wheat Studies of the Food Research Institute", Vol. V, No. 4: "The Place of Wheat in the Diet" (Stanford University, California, 1929). Post-war figures of the percentage of total calories derived from cereals would in all cases be lower than those shown above.

The pre- and post-war tendencies in the *per caput* food use of wheat in the country where wheat accounted for the bulk of cereal intake before the war are given in Table III below.

Table III.

Per Caput WHEAT CONSUMPTION.^a

	1894-1899	1909-1914 Kilogrammes	1929-1934
France	216.4	219.6	190.0
Italy	126.3	162.2	171.2
British Isles	151.3	153.2	134.7
U.S.A.	145.6	140.2	100.2

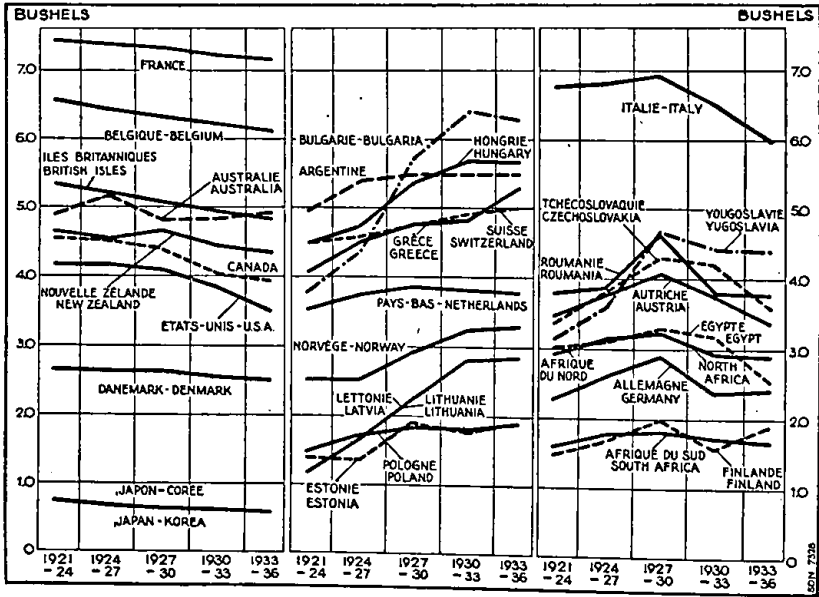
^a Based on "Wheat Studies of the Food Research Institute", Vol. XI, No. 7, and Vol. XII, No. 10 Given in bushels of 60 lb. in the original; converted into kilogrammes at the rate of 1 lb. = 0.4536 kg. (1 kg. = 2.2 lb.).

The fall in the food use of wheat was already in progress in the United States before the war. Between the end of the century and the most recent period shown, average consumption fell by about a third. At the same time, the *per caput* consumption of cornflour, the only other cereal at all widely used in the United States, fell even more sharply (from 47 kg. in 1899 to 9 kg. in 1927).

Total cereal consumption, which is estimated ¹ to have provided 1,500 calories per head daily in 1899, does not now provide much more than 850 calories per head per day. In the United Kingdom, the tendency is in the same direction, though not quite so marked. A recent study ² suggests that the proportion of total calories derived from cereals fell from about 35%—as shown in Table II—before the war to 30% in 1924-1928.

15. Post-war tendencies in the *per caput* consumption of wheat in certain countries are shown in Diagram I below: ³

Diagram 1.
Per Caput FOOD USE OF WHEAT IN VARIOUS COUNTRIES.



¹ Based on "Wheat Studies of the Food Research Institute", Vol. V, No. 4.
² A. W. FLUX: "Our Food Supply before and after the War", in *Journal of the Royal Statistical Society*, 1930. It should be noted that the pre-war figures relate to Great Britain and Ireland and the post-war figures to Great Britain and Northern Ireland. The exclusion of the Irish Free State from the post-war figures would tend to invalidate the comparison with the pre-war figures to whatever extent the food habits of the inhabitants of the Irish Free State differ from those of the inhabitants of the rest of the British Isles. As, however, the population of the Irish Free State in 1924-1928 averaged about 3 million persons, compared with over 45 millions in Great Britain and Northern Ireland, it is clear that differences in food habits of considerable magnitude would be needed to affect the averages seriously.
³ Diagram taken from "Wheat Studies of the Food Research Institute", Vol. XII, No. 10.

To attempt to interpret each of these curves would be beyond the scope of the Mixed Committee's task. It may, however, be pointed out that the countries in the first group, which include all with a consistent downward trend, are—with the exception of Denmark and Japan—countries where wheat is the preferred cereal and—with the possible exception of Japan—countries with high levels of real income. Hence it is reasonable to suppose that the decline in wheat consumption represents either a decline in total calorie intake per head or the displacement of wheat by other (perhaps more highly protective) foods.

The second group, consisting of those in which *per caput* consumption either rose continuously or rose and then remained fairly stable, includes certain Northern and Eastern European countries in which rye is the staple cereal; it is likely that the rise in wheat consumption represents largely the displacement of rye.

The third group consists of countries where *per caput* wheat consumption rose up to 1930 and fell thereafter. In most of these, another cereal is still largely used: rye in Finland, Germany, Austria and Czechoslovakia, and maize in Roumania and Yugoslavia. The increase in average wheat consumption in the earlier years of the post-war period probably represents chiefly the displacement of other cereals, and the subsequent decline, a retreat to the cheaper cereals owing to the depression.

16. The trend movements in the human consumption of cereals other than wheat have already been dealt with to some extent by implication in the preceding paragraphs, and, in default of adequate statistical material, it is difficult to add much to the facts already stated. In most countries of Northern, Central and Eastern Europe, there appears to be a secular tendency for wheat-bread to replace rye-bread: Table I above shows a much greater decline in the average *per caput* utilisation of rye than of wheat. In these countries, however, as well as in Western Europe and the United States, it seems likely that the average *per caput* consumption of all bread cereals has tended to decline, rye consumption falling off by more than wheat consumption rose. Unfortunately, the statistics of the fodder use of rye and maize in countries where these cereals are widely used for human consumption are in most cases too defective to enable this supposition to be put to the test

of rigid statistical verification. For Germany, however, statistics are available which show a declining total bread consumption and an increasing share of wheat in the aggregate. The following table shows the use of flour per head of the German population during the years indicated:

Table IV.

Per Caput Use of Wheat Flour and Rye Flour in Germany.^a

	Rye flour		Wheat flour		Total flour
	Kg.	%	Kg.	%	Kg.
1912/13	65.4	54	56.3	46	121.7
1924/25	58.1	53	50.7	47	108.8
1927/28	49.3	47	54.6	53	103.9

^a Taken from *Berichte über Landwirtschaft*, Vol. 27: "Umstellung des deutschen Getreidebaus" (Berlin, 1930).

In Finland, where rye is used almost exclusively for human consumption, the *per caput* utilisation fell from about 175 to about 125 kg. between 1909-1913 and 1926-1928, while the *per caput* utilisation of wheat rose from 40 to 50 kg. In Denmark and Norway, the *per caput* utilisation of rye for all purposes fell during this period by more than that of wheat increased, while, in Sweden, wheat appears to have gained about as much as rye lost. Almost all the countries for which data are available show a smaller *per caput* utilisation of rye for all purposes in recent years than before the war. In view of the general increase in animal husbandry, it is probable that the greater part of this decline was due to a falling-off of human consumption.

17. In Europe, maize is extensively used as the principal bread cereal of part of the population only in Roumania, Yugoslavia and parts of Bulgaria, Czechoslovakia, Hungary, Italy and Poland. The use of maize inadequately supplemented by foods supplying nutrients in which it is deficient has been shown to be the cause of pellagra—a serious disease. In Italy, this disease was very widespread at the beginning of this century, but an extensive public health campaign has been successful in reducing the death rate from pellagra from 10.7 per 100,000 in 1900 to 0.2 per 100,000 in

1928.¹ The campaign included propaganda against excessive maize consumption and against its production under conditions which do not permit it to ripen completely, the prohibition of the sale of "spoiled" maize and the establishment of rural bakeries and soup-kitchens with the object of supplying a nutritious diet including wheat bread.

As the maize eaten by the rural population is also produced by them, no accurate records of consumption are available and it is not possible to measure exactly the trend of consumption for the parts of the populations concerned. The tendency for wheat consumption to rise in these countries does, however, make it appear likely that maize consumption has been reduced, and this supposition is confirmed by such partial indications as are available. According to figures supplied by the Roumanian Union of Agricultural Chambers, the average consumption of polenta, or maize bread, fell from about 140 kg. per head in the Old Kingdom before 1916 to about 68 kg. per head in 1936.

Maize is also extensively eaten in certain parts of the United States.² The efforts to combat pellagra in regions where this is the principal cereal have been directed principally to supplementing the maize diet with yeast, milk and lean meat, and not to replacing maize with another cereal.

Sugar.

18. The decline in the use of cereals in most Western countries during the present century has been associated with a remarkable rise in the consumption of sugar. Sugar is exclusively a fuel food: it is completely free of fat, protein, vitamins or mineral elements. It is valued chiefly for its ease of assimilation, its taste and for the flavours it imparts to other foods. The substitution of sugar for cereals as a source of energy thus involves a loss of valuable nutritive properties; on the other hand, the rise in the consumption of sugar is partly due to increased use of fruit, which is richer in these properties than cereals.

¹ W. R. AYKROYD: "Pellagra", in "Nutrition Abstracts and Reviews", Vol. 3, 1933.

² See also Chapter 7, paragraph 8.

19. The increase in the consumption of sugar during the past century is one of the most remarkable changes in food habits which have occurred, and illustrates perhaps better than any other single index the rise in the standard of comfort. Sugar has been extracted from cane from very early times, but it was not until the end of the eighteenth century that the process of manufacturing sugar from the juice of the sugar-beet was discovered. In Europe, the sugar-beet industry was first established in France with State assistance under Napoleon; everywhere it has been fostered by Governments. World production of beet sugar is estimated to have increased from 3.8 million tons in 1893/94 to 8.9 million tons in 1913/14 and 11.5 million tons in 1930/31. The increased competition of sugar-beet led to very important technical improvements in the cane-sugar industry and world production of cane sugar rose from 9.8 million tons in 1893/94 to 19.6 and 29.2 million tons in the two later campaign years mentioned above.¹

It is a noteworthy fact that up to the present the desire of the State to assure large domestic supplies of foods of prime necessity has resulted principally in the encouragement of the production of foods of high energy value, notably cereals and sugar. As a result of these developments, the sugar changed, in countries with a high standard of living, from a luxury enjoyed only by the wealthy to a necessity of life even for the lowest income groups of the population. In 1821, the people of the United States consumed 3.6 kg. of sugar per head; by the middle of the century the amount had risen to 13.6 kg.; in 1900 it was 30.2 and in 1928 over 47 kg. per head. Average consumption in the United Kingdom is estimated to have quintupled in the course of the past century; in France, average *per caput* consumption increased from 1.33 kg. in 1817-1821 to about 11 kg. at the beginning of the century and 20 kg. in 1920-1930; and in Germany it rose from 3 kg. per head in 1850 to nearly 14 kg. in 1900.

20. The trend of *per caput* consumption during the present century is illustrated in Table V.

¹ Estimates of Dr. Gustav MIKUSCH, Vienna.

Table V.^a

Per Caput SUGAR CONSUMPTION IN VARIOUS COUNTRIES.

	Kg. of raw sugar		
	1900/01	1913/14	1928/29
Denmark	23.4	45.7	56.1
U.S.A.	30.3	37.7	54.0
England	44.5	42.4	45.9
Switzerland	24.3	32.2	43.1
Sweden	17.9	26.0	39.9
Netherlands	20.1	22.8	31.0
Belgium	10.7	15.1	27.9
France	16.6	21.9	24.6
Germany	13.9	21.1	26.1
Austria	} 8.1	} 12.9	31.1
Czechoslovakia			28.0
Hungary			13.5
Russia			9.0
Poland	} 6.5	} 11.5	13.5
Spain	4.5	6.7	12.8
Italy	2.8	5.3	9.7
Yugoslavia . . . . .	...	...	5.5 ^b

^a Taken from *Berichte über Landwirtschaft*, Vol. 40: "Die Deutsche Zuckerwirtschaft" (Berlin, 1931).

^b Figure furnished by Dr. E. MARKOVIC, member of the Mixed Committee.

21. The great increase and high level of sugar consumption in certain countries have caused some concern to students of the physiological aspects of nutrition.¹ The Health Organisation of the League of Nations will shortly proceed to consultation and study designed to determine the amount of sugar consumption which must be regarded as excessive. At the same time, an examination of Table V shows a wide range of sugar consumption in different countries; and there is no reason to doubt that in many parts of the world there is scope for a considerable increase in the consumption of this food.

Meat.

22. Meat is valuable as a source of tissue-forming protein and of iron, and is also valued on account of its appetising and stimulating properties. The glandular tissues—liver, sweetbread, kidneys—are highly nutritious, particularly as regards the character of the protein and the mineral and vitamin content.

¹ See League of Nations: "The Problem of Nutrition", Vol. II — "The Physiological Bases of Nutrition": "The increasing habit in certain countries of large sugar consumption tends to lessen the amount of protective foods in the diet and is to be regarded with concern".

23. The production of meat is widely distributed throughout the world; indeed, meat is second only in importance to wheat as a staple food. World trade is confined within relatively narrow limits. The trade in beef and mutton is largely a movement from the southern to the northern hemisphere, while world trade in pig meat is largely confined to the northern hemisphere. The movement of meat from Europe is entirely dependent upon refrigeration: chilling or freezing. The Argentine Republic is by far the most important exporter of beef, with Australia, Uruguay and New Zealand following. The depletion of European live-stock during the war resulted in an increase in the relative importance of foreign supplies in European consumption; but European herds have grown considerably in the past ten years and the volume of beef entering international trade has declined. On the other hand, there was an increase in the trade in mutton and pig meat up to 1931. New Zealand is the principal exporter of mutton and lamb, followed by Australia and the Argentine Republic, while Denmark is the main exporter of pig meat. The United Kingdom is the principal market for imported meats of all kinds and, in addition, imports live cattle from the Irish Free State.

24. No clear trend in total meat consumption can be discerned on the basis of the available statistical material. Table VI below compares the average *per caput* consumption of certain meats in a number of countries in 1909-1913 and 1925.

Table VI.

ESTIMATED ANNUAL *Per Caput* CONSUMPTION OF CERTAIN MEATS,
1909-1913 AND 1925.^a

Kilogrammes ^b

	Beef and veal		Lamb and mutton		Pig meat		Total meat	
	1909-1913	1925	1909-1913	1925	1909-1913	1925	1909-1913	1925
New Zealand	63.5	85.3	65.3	34.9	—	—	—	—
United Kingdom	29.9	32.7	14.1	12.2	15.0	19.1	59.0	64.0
United States	31.8	32.2	3.2	2.3	28.1	30.8	63.0	65.3
Germany	16.8	17.2	0.9	0.9	31.3	25.9	49.0	44.0
Belgium	14.1	20.4	0.9	0.5	—	15.4	—	36.3
Netherlands	14.1	15.4	—	—	—	—	—	—

^a Data are taken from Imperial Economic Committee "Cattle and Beef Survey" (London, 1934) and "Mutton and Lamb Survey" (London, 1935).

^b Given in pounds in the original; converted into kilogrammes at the rate of 1 lb. = 0.4536 kg.

The figures for the United Kingdom and the United States suggest that total meat consumption was somewhat higher in 1925 than before the war. It was lower in Germany; but it will be seen from the table given in the following paragraph that the pre-war level had been reached again by 1929. Consumption of meat in France has been estimated¹ at 27 kg. per head in 1909 and 34 kg. per head in 1929.

25. For more recent years more complete estimates (in some cases very rough) of meat consumption are available. These are summarised in Table VII below:

Table VII.

ESTIMATED ANNUAL *Per Caput* CONSUMPTION OF MEAT (IN KILOGRAMMES)
1925-1929 AND 1930-1934.^a

	Total meat		Beef and veal		Mutton and lamb		Pork, bacon and lard	
	1925-1929	1930-1934	1925-1929	1930-1934	1925-1929	1930-1934	1925-1929	1930-1934
New Zealand . . .	106.7 ^b	103.6 ^b	60.3 ^b	53.9	35.8	41.8	10.5	8.7
Australia	107.2	91.5	69.0	46.2	30.0	37.3	8.2	8.0
Canada	69.1	65.3	30.9	27.5	2.8	3.1	35.4	34.7
United Kingdom .	62.4	63.7	31.5	29.1	12.3	13.9	18.6	20.7
United States ^c . .	62.1	61.2	24.0	23.6	2.7	3.2	35.4	35.4
Denmark	47.0	52.4	21.9	26.4	—	—	25.1	36.0
Germany	49.8	51.0	17.1	16.1	0.8	0.6	31.9	34.3
Switzerland . . .	44.7	47.2	25.6	25.5	0.7	0.6	18.8	21.1
Netherlands . . .	42.5	45.6	20.0	17.9	0.4	0.5	22.1	27.2
Belgium	38.3	40.8	19.3	17.9	2.7	2.4	16.3	20.5
Sweden	38.7	36.1	19.0	14.0	0.7	1.1	19.0	21.0
Norway	31.0	33.1	14.4	14.7	5.5	5.4	11.1	13.0
Czechoslovakia . .	34.2	33.3	13.3	12.5	3.4	3.3	17.5	17.5
France	40.3	39.0	23.5	20.9	3.0	2.6	13.8	15.5
Poland	18.0	18.7	6.9	7.3	0.3	0.2	10.8	11.2
Italy	18.9	16.3	11.8	9.8	1.6	1.3	5.5	5.2

^a League of Nations: "The Problem of Nutrition", Vol. IV — "Statistics of Food Production, Consumption and Prices" (revised by the International Institute of Agriculture on the basis of information and modifications received from Governments).

^b Veal not included.

^c The figures for the United States are not revised. Revised figures for federally inspected meats only (representing about 60 to 70% of the total) have been received, and are as follows:

	1925-1929	1930-1934
	Kg.	Kg.
Beef and veal	20.2	17.8
Mutton and lamb	1.9	2.4
Pork, bacon and lard	25.8	25.5
Total	47.9	45.7

¹ By the Office des Renseignements agricoles.

Perhaps the most striking feature of this table is the extremely wide range in the estimated meat consumption of different countries. To take but two examples, it is estimated that in 1930-1934 average meat consumption was almost seven times greater in New Zealand than in Italy and twice as high in the United Kingdom as in France.

26. To a greater extent than is the case of many other foods, statistics of the average *per caput* consumption of meat are likely to conceal large differences in the consumption of different sections of the population. This is true also of the figures showing *changes* in *per caput* consumption. For example, a comparison of Tables VI and VII above suggests that total meat consumption per head in the United Kingdom, the United States and Germany (the three countries for which pre-war figures are available) changed but little between 1909-1913 and 1930-1934. It seems highly probable that this virtual stability in average meat consumption results from the fact that certain sections of the population which formerly ate little or no meat have, in post-war years, greatly increased their meat consumption, while other sections of the population, which formerly ate meat to excess, reduced theirs.

27. Changes in the consumption of individual meats are much more marked than changes in the consumption of meat as a whole. The consumption of the individual meats in the different countries appears to depend largely on conditions of production, and (as is shown in some detail in Chapter 4 below) relatively small changes in price cause considerable shifts in demand. These shifts represent the substitution of the cheaper for the more expensive meats: the demand for meat as a whole does not show great flexibility. In the post-war period, there was, in most countries, a switch from beef consumption to mutton and pork, but in certain cases these tendencies have been reversed in recent years.

Fish.

28. Sea foods are especially valuable on account of their iodine content, which is greater than that of land plants or the flesh of land animals. The demonstration of the unique qualities of fish oils as a source of vitamins A and D suggests the importance of fat fish

in the diet.¹ The outstanding fat fish are salmon, shad, herring, butterfish and mackerel.

In particular, the value of the high content of fat-soluble vitamins in the livers of some fish is becoming increasingly recognised. But there is still much scope for the expansion of preparations of these substances—particularly from the livers of halibut and tunny-fish, where the necessary vitamins are highly concentrated.

29. Such statistics of fish production and consumption as are available disclose no very marked trend movement. For the United Kingdom, the average *per caput* consumption has been estimated at about 18.1 kg. a year in 1909-1913 and the same in 1924-1928.² This is a much higher figure than in the United States, France or Germany. For the United States, consumption in post-war years would appear to have averaged no higher than 6.8 kg. per head.³ In Germany, average *per caput* fish consumption rose from 8.4 kg. a year in 1909-1913 to 9.5 kg. a year in 1930-1931.⁴ Consumption in France in 1927-1934 fluctuated between 7.5 and 8.2 kg. per head per year; in Italy, consumption is about 5 kg.; in Switzerland, only 2.7-3 kg.; and in Denmark, about 11.3 kg.

30. It is difficult to resist the conclusion that there is scope for a large increase in fish consumption. In recent years, considerable progress has been made in fishing methods, particularly through the substitution of mechanically propelled craft for sailing vessels and the application of wireless telegraphy to trawlers. Improvements in the technique of canning, refrigeration and drying extend the area of consumption and compensate in some degree for the irregular nature of the catch of this highly perishable food. Methods of refrigeration have improved remarkably during the past twenty years and, as a result of research work at present in progress, further improvements may be confidently expected. Progress has also been made in marketing methods, but much remains to be done in

¹ McCOLLUM and SIMMONDS: "The Newer Knowledge of Nutrition" (4th ed., New York, 1929).

² A. W. FLUX, *op. cit.*

³ U.S. Department of Commerce, Domestic Commerce Series, No. 38 — "Apparent *Per Capita* Consumption of Principal Foodstuffs in the United States" (Washington, 1930).

⁴ *Berichte über Landwirtschaft*, Vol. 88 — "Deutschlands Nahrungs- und Futtermittelversorgung" (Berlin, 1933).

this direction. In particular, transporting the inedible portions of fish frequently adds unnecessarily to costs on retail markets, and in many countries the retail price of fish seems very high when compared with the price received for the catch and with the relationship between retail and wholesale prices of other foods. This is no doubt also partly due to the instability of wholesale prices resulting from the irregularity of the supply. The retailer tends to protect himself by fixing the retail price at a point at which he is covered against severe rises in wholesale prices.

Poultry and Eggs.

31. Statistics of poultry consumption are difficult to obtain and are of doubtful reliability, on account of the widespread practice of poultry-keeping among cottagers in all countries. There has been a marked increase in the number of specialised poultry farms since 1900, and it is not open to doubt that in most countries the consumption of poultry has tended to rise in post-war years. The amounts received at four great urban markets in the United States rose from 97 million kg. in 1920 to nearly 181 million kg. in 1931 and, though it declined in subsequent years, still amounted to nearly 136 million kg. in 1935. Consumption per head is estimated at 5.9 to 6.4 kg. In Germany, poultry consumption is estimated to have risen from 1.2 kg. *per caput* in 1925 to 1.8 kg. in 1930 and to have remained at 1.6 kg. thereafter. In Switzerland, consumption of poultry was estimated at 1.1 kg. per head in 1921, 2 kg. per head in 1932 and 1.9 kg. per head in 1934. In the United Kingdom, the consumption of poultry rose steadily from 1.5 kg. per head in 1925 to 2.3 kg. per head in 1934. In Canada, where the consumption of poultry has long been relatively high, the same tendency is apparent—consumption rising from 4.3 kg. per head in 1925 to 5 kg. in 1930 and to 8.4 in 1936.

32. Eggs are a food of special merit; not only are they high in energy value, but they are an important source of "good" protein, minerals (especially iron) and certain vitamins. It is therefore satisfactory to be able to record that there has been a marked upward tendency in the consumption of eggs in recent years. This is illustrated in the following table of estimated annual consumption per head:

Table VIII.

ESTIMATED ANNUAL *Per Caput* CONSUMPTION OF EGGS.^a

	1925-1929	1930-1934
Canada	295 ^b	285 ^b
Belgium	241	236
United States	251 ^c	252 ^c
United Kingdom	149	172
Switzerland	126	157
France	123	149
Germany	124	129
Italy	112	119
Sweden	90	110
Austria	93	98
Denmark	98	111

^a From League of Nations: "The Problem of Nutrition", Vol. IV — "Statistics of Food Production, Consumption and Prices", documentation prepared by the International Institute of Agriculture (Geneva, 1936).

^b Gross figures (no deduction for eggs intended for incubation, wastage, etc.).

^c Figures corrected by U.S. Department of Agriculture.

The only countries included in the above table which did not share in the upward trend of recent years are Canada and Belgium; in these countries, egg consumption was already very high in the earlier period.

Dairy Products.

33. Milk is the nearest approach we possess to a complete food. It contains all the materials essential for the growth and maintenance of life in a form readily assimilable by the body: the energy-giving nutrients (protein, fat and carbohydrate); all the known essential vitamins; calcium, phosphates and other minerals salts. Experiments carried out on animals and observations of the effect of milk consumption on the growth of children and health of children and adults have established beyond any doubt its very high nutritive qualities. Of the milk products, cheese retains the proteins of milk and a large proportion of the calcium salts and vitamins; butter retains the fat-soluble vitamins of milk and is the most digestible and generally nutritious fat in the modern dietary. Separated or skim milk retains all the constituents of milk except

fat and is therefore rich in protein, calcium, phosphorus and the water-soluble vitamins.

34. The valuable nutritive properties of milk have been known from early times and there has been a steady expansion in the production and consumption of milk, so that to-day the cash value of the world's production of milk exceeds the cash value of any other farm crop.

During the past fifty years there has been a worldwide increase in the production of milk. The growth of dairying has, indeed, been one of the most remarkable features of recent world agricultural development, and the upward trend of milk production has been accentuated during the past decade. The increase in output has far exceeded the growth in population and has coincided with well-considered efforts in many countries to direct public attention to the special nutritive virtues of milk and other dairy products. At the same time, in many parts of the world, public control and inspection have resulted in higher standards of cleanliness and a greater assurance of safety in the consumption of whole milk. As a result of all these causes, there has been a marked and general increase in the consumption of milk and milk products since at least the beginning of the present century.

35. It is not possible to say what proportion of world milk production is consumed in liquid form and what proportion in the form of butter, cheese, etc. It is generally assumed that rather more than half is consumed as whole milk, though the proportion naturally varies widely from country to country. The statistics of consumption of dairy products as a whole leave much to be desired, but they show clearly that the broad trend of consumption has been upward.

For the United Kingdom, total supplies of all dairy produce are estimated¹ to have increased from 5,200 to 5,500 metric tons (in terms of fluid milk) between 1909-1913 and 1924-1928; dairy produce accounted for nearly 20% total calorie intake (about 600 calories per head per day) in the latter period, compared with 16% (less than 500 calories per head per day) in the earlier period. Slightly less than half the dairy-product calories

¹ A. W. FLUX, *op. cit.*

of the latter period were derived from whole milk, slightly more than half from butter and cheese and a small amount from condensed milk. For Germany, the daily *per caput* consumption of dairy products is estimated¹ to have yielded 515 calories in 1909-1913 and 541 calories in 1931-1932. In the United States, the average *per caput* consumption of dairy products is estimated² to have increased from 363 to 408 kg. (in terms of whole milk) at the end of the nineteenth century to 455 kg. in 1926. PEARL estimated³ that, in the years 1911-1916, 15% of the energy value of the food eaten by the American people was derived from dairy products and the proportion in post-war years must be considerably higher.

36. According to the most recent statistics,⁴ the average *per caput* consumption of liquid milk in the United States rose steadily from 144 litres in 1923 to 154 litres in 1929 and fell back somewhat in subsequent years.

The statistical data relating to liquid milk consumption in the United Kingdom are unsatisfactory. The Linlithgow Commission, reporting in 1923, expressed the opinion that the consumption of milk had almost doubled within the previous forty years. As total population increased by 46% during this period, this would involve an average increase of about a third in *per caput* consumption. According to an unofficial estimate,⁵ consumption per head in Great Britain rose by 33% between 1890 and 1907/8, or at the rate of 1.8% per annum; and by an average of just under 1% a year since 1924/25, to 100 litres in 1930/31. Consumption per head, therefore, appears to have increased less rapidly after than before the war; the figure of 100 litres per head is about two-thirds of the American and one-third of the Finnish consumption. This slackening in the rate of growth of consumption of liquid milk after the war is no doubt partly connected with the relatively high retail price of milk. In the year ending September 1931, the retail price of milk was nearly 75% above the pre-war level, while the cost-of-living index was 50% higher and the average retail prices of foods other than milk 30% higher.

¹ *Berichte über Landwirtschaft*, Vol. 89, *op. cit.*

² U.S. Department of Commerce, *op. cit.*

³ Raymond PEARL: "The Nation's Food" (Philadelphia and London, 1920).

⁴ Supplied by the U. S. Department of Agriculture.

⁵ Ruth L. COHEN, "The History of Milk Prices" (Oxford, 1936).

It must also be borne in mind that milk has not been generally regarded as a food in the United Kingdom, but as an adjunct to other foods. In recent years, steps have, however, been taken to popularise the consumption of whole milk as a beverage, and there are now several hundred milk-bars in London alone.

The trend of milk consumption is also upwards in France, though the average remains very low in that country. In recent years, "champagne-milk" (full milk, carbonised and flavoured with fruit-juice) has been consumed in considerable quantities and the consumption of yoghurt is increasing rapidly. Propaganda in favour of whole-milk consumption has made great headway in certain countries of Northern Europe. In the Netherlands, for example, the institution of the milk-bar has become increasingly popular during the past few years, and the consumption of milk and cream per head has been roughly estimated to have risen from 77 litres in 1930 to 145 litres in 1932 and 127 litres in 1934. In Latvia, the consumption of milk and dairy products increased by 30% between 1930 and 1935, while population rose by only 2½%. In Denmark, where the high nutritive properties of milk have also been extensively advertised, the consumption is estimated to have risen from 100 litres per head in 1926 to 186 litres in 1934. No figures are available of the total consumption of liquid milk in Finland, but family budget enquiries conducted there in 1928 showed that town workers and their families consumed as much as 282 litres per head. In Sweden, the figure in 1932/33 was over 136 litres per head.

37. The fresh milk consumed in the world is largely of domestic production; but during the past fifty years—and particularly during the past decade—there has been a remarkable expansion in the international trade in butter and cheese.

38. The post-war development of the international trade in butter is briefly summarised below. The figures relate to exports.

Table IX.
WORLD EXPORTS OF BUTTER.

In thousands of quintals.			
1909-1913 (average)	3,251	1932	5,508
1924-1928 (average)	4,585	1933	5,590
1929	5,121	1934	5,920
1930	5,336	1935	6,041
1931	5,753		

World exports of butter were almost twice as high in 1925 as in the pre-war quinquennium. This increase was largely directed to the British market, where imports (which had already doubled ¹ in the last fourteen years of the nineteenth century) rose from a yearly average of about 2,032,080 quintals just before the war to about 2,870,000 quintals in 1924-1926, 3,175,000 quintals in 1929 and 4,826,200 quintals in 1935. *Per caput* consumption must have increased very rapidly in the years preceding the war. Consumption was officially estimated ² at 6.9 kg. per head in 1907 and 7.4 kg. per head in 1925; the figure rose steadily to 8.0 kg. in 1929 and 11.4 kg. in 1935.

In the United States, which is the world's largest butter producer, butter consumption appears to have remained, on the whole, fairly stable at about 8 kg. per head for at least the last twenty-five years.

Germany is the largest European producer of butter and the second largest importer in the world. Production was greatly increased after the war and butter consumption per head, according to a private estimate,³ rose from about 6.2 kg. before the war to 7.6 kg. in 1927. This latter estimate may be high, but the available statistics leave no doubt that the tendency of consumption was distinctly upwards after 1925.

39. The pre- and post-war *per caput* consumption of butter in a large number of countries has been privately estimated and, without subscribing to the accuracy of the figures given, it is of interest to examine the tendency they reveal:

Table X.

PRE- AND POST-WAR ANNUAL *Per Caput* CONSUMPTION OF BUTTER.^a

	Kg. per head			Kg. per head	
	Pre-war	Post-war		Pre-war	Post-war
Canada	12.6	13.6	Denmark	8.0	5.7
Australia	11.6	13.4	Switzerland	5.5	5.4
United Kingdom	7.7	8.2	Netherlands	7.6	5.1
United States	7.7	8.0	France	3.9	4.0
Germany	6.7	7.6	Russia	2.3	2.6
Sweden	7.5	7.2	Italy	1.1	1.0

^a *Berichte über Landwirtschaft*, Vol. 22 — "Weltproduktion und Welthandel der Molkereierzeugnisse" (Berlin, 1930).

¹ From 1,500,000 to 3,300,000 cwt. between 1886 and 1900.

² Report of the Imperial Economic Committee on Dairy Produce (London, 1926-1936).

³ *Berichte über Landwirtschaft*, Vol. 22 — "Weltproduktion und Welthandel der Molkereierzeugnisse" (Berlin, 1930).

The post-war figures relate to 1927. The only countries to show a marked decline in *per caput* butter consumption are Denmark and the Netherlands, where the consumption of margarine has considerably increased. In most other countries there was a fairly well-marked increase in butter consumption. The tendency of consumption during the past decade is shown in the following table:

Table XI.

ESTIMATED *Per Caput* CONSUMPTION OF BUTTER SINCE 1925.^a

	1925 Kg.	1929 Kg.	1932 Kg.	1935 Kg.
New Zealand	15.1	16.3	16.3	18.1
Irish Free State . . . . .	...	17.8	...	18.8 ^b
Canada	12.4	13.3	13.8	14.0
Australia	13.0	13.4	13.1	14.1 ^b
United Kingdom	7.2	8.0	9.8	11.4
Denmark	5.6	5.9	8.5	9.4
Belgium . . . . .	...	7.8	10.4	8.2
United States	8.0	7.9	8.2	7.8
Germany	5.2	7.6	7.4	7.5
Switzerland	5.0 ^c	5.8	6.5	6.9
Netherlands	5.6	5.9	8.2	6.3
France	4.4	5.1	6.1	5.8
Italy	1.2 ^d	1.0	1.1	1.2 ^b

^a League of Nations: "The Problem of Nutrition", Vol. IV — "Statistics of Food Production, Consumption and Prices", documentation prepared by the International Institute of Agriculture (revised) (Geneva, 1936). Given in pounds in the original; converted into kilogrammes at the rate of 1 lb. = 0.4536 kg. The figures for 1935 are taken from "Dairy Produce", Imperial Economic Committee, London, 1936.

^b 1934. ^c 1921. ^d 1926.

A general upward trend is clearly apparent from the above table. The only significant exceptions are recent declines in Belgium and the Netherlands.

The decline in consumption in these countries is, in all likelihood, largely due to the growing industrialisation of butter manufacture. So long as butter remained a cottage industry, the small farmer consumed some part of what he produced. With the growth of specialised dairies, however—a development which undoubtedly brought great benefits to the industrial population—the farmers of many countries frequently tended to give up entirely the home manufacture of butter, sell almost all their liquid milk, and buy margarine instead of butter for their own use because it is cheaper.

40. The consumption of cheese has tended to increase slightly in most countries during the past decade:

Table XII.

ESTIMATED *Per Caput* CONSUMPTION OF CHEESE.^a

	1925-29 Kg.	1930-34 Kg.		1925-29 Kg.	1930-34 Kg.
Switzerland	9.9	8.4	United Kingdom	—	4.3
Netherlands	5.1	6.3	New Zealand	2.0	3.5
Germany	5.0	6.0	Belgium	2.8 ^b	2.9
France	5.1	5.7	U.S.A.	2.1	2.1
Denmark	5.2	5.8	Australia	1.7	1.8
Italy	4.6 ^c	4.8	Canada	1.6	1.6

^a League of Nations: "The Problem of Nutrition", Vol. IV — "Statistics of Food Production, Consumption and Prices", documentation prepared and revised by the International Institute of Agriculture.
 Given in pounds in the original; converted into kilogrammes at the rate of 1 lb. = 0.4536 kg.
^b 1929. ^c 1926-1929.

Vegetable Oils.

41. At least thirty different trees and plants have been used to produce oil on a commercial scale. Of the vegetable oils used for human consumption, olive oil, cottonseed oil, linseed oil, coconut oil, corn oil, palm-kernel oil, soya-bean oil and ground-nut oil are among the most important. In recent years, sunflower seed has become of increasing importance. The special dietary property of the vegetable oils lies in their very high energy value; they do not contain vitamins and mineral matter.

42. Statistics of the production of the various oilseeds and nuts are too incomplete to enable the trends in production to be measured accurately; and as a large but unknown part of production is used for purposes other than human consumption—such as in the manufacture of soap and for industrial purposes—it is, as a rule, impossible to trace the trends in human consumption.¹ Production of many of the oilseeds and nuts is high in Asia and Africa and olive oil is extensively produced and consumed in the Mediterranean countries. The principal import markets for oilseeds are France, Germany, the Netherlands and Italy, and the United Kingdom, United States and Japan are also important markets. The crushed seed, etc., which is left when the oil is extracted from the seed or

¹ See Imperial Economic Committee — "Vegetable Oils and Oilseeds" (London, 1936).

plant is a very important by-product, the oil cake or meal serving as food for live-stock or as fertiliser.

43. The total utilisation of vegetable oils has increased remarkably during the past thirty years and, from such fragmentary indications as are available, it would seem likely that the human consumption has also risen in most Western countries. Vegetable oils have tended to some extent to displace animal fats as shortenings and cooking fats. As early as the 1880's, lard was adulterated with cottonseed oil, and later lard substitutes were manufactured from oleostearin and cottonseed oil, and more recently the process of hydrogenation has enabled solid and tasteless cooking-fats to be produced from cottonseed, maize, soya-bean and other oils alone. Moreover, the increasing use of salads and fruits, to which reference is made below, has also involved an increase in the use of salad oil, chiefly olive oil and also refined, deodorised and decolorised cottonseed oil.¹

44. Vegetable oils are consumed as such mainly in the form of olive oil, which is widely used in the Mediterranean countries, and margarine, which is extensively used in most parts of the world as a butter substitute. The composition, and in consequence the dietary value, of margarine is different in different countries. The general tendency seems to be to increase the proportion of vegetable matter and reduce the proportion of animal matter used in its manufacture.² Thus, in the United States, packing-house fats were more important than vegetable fats until 1919, but since then the reverse has been true; coconut oil and cottonseed oil predominate. In Belgium, Denmark, Germany, the United Kingdom and the Netherlands, vegetable oils are also a more important constituent of margarine than are animal oils; in Northern Europe, however, there has been a tendency in recent years to make greater use of whale oil and other marine oils, but these still remain relatively unimportant. In the United Kingdom, the Netherlands, Norway and some other countries, the manufacturers of margarine have, latterly, produced margarine containing the vitamin A and vitamin D equivalent of butter.

¹ See "Recent Economic Changes", Vol. I (New York, 1929).

² See Katherine SNODGRASS: "Margarine as a Butter Substitute" (No. 4 of Fats and Oils Studies of Food Research Institute, Stanford University, California, U.S.A.).

45. The following table shows the post-war changes in *per caput* consumption of margarine in several countries:

Table XIII.
ESTIMATED *Per Caput* CONSUMPTION OF MARGARINE.^a

	1913 Kg.	1924 Kg.	1926 Kg.	1930 Kg.	1936 Kg.
Denmark	15.0	20.7	22.5	22.8	19.5
Norway	10.9	16.0	17.5	....	....
Netherlands	2.0	7.1	8.5	8.9	5.4
Germany	3.6	5.6	6.5	7.9	5.6
Sweden	4.5	5.6	6.0	....	....
United Kingdom	3.5	5.4	6.0	....	....
Belgium	1.5	3.4	4.5	5.4	4.2
France	0.4	0.7	1.0	....	....
United States	0.7	1.0	1.0	1.2	0.9 ^b

^a The figures for 1913, 1924 and 1926 are taken from U.S. Department of Agriculture, "Foreign Crops and Markets", May 14th, 1928. Those for 1930 and 1936 are from official national sources.

^b 1933.

There is a large range of variation in the consumption of margarine in different countries. Consumption is exceptionally high in Denmark, where it rose from 1 kg. per head in 1888 to 11½ kg. per head in 1908 and 22½ kg. per head in 1930. Part of the post-war increase was at the expense of butter, as is shown in Table IX above, but, none the less, average butter consumption in Denmark remained quite high in comparison with that in neighbouring countries. The total consumption of fat in Denmark is remarkable high; the fact that this is composed to so large an extent of margarine must be largely attributed to the special structure of the agricultural system. The skim-milk by-product of the dairy industry is used as feed for the pigs, and in addition vegetable oilseeds are imported in large quantities. The oil is used (along with skim milk) to manufacture margarine and the oilcake is used as animal feed. In recent years, vitamin-A deficiency has been observed in Denmark and certain circles have aimed at increasing the home consumption of butter.

Margarine consumption is also high in Norway, where the dairying industry is not very extensive; the margarine used in this country is vitaminised. It is also considerable in the Netherlands, a dairying country, where the consumption of butter is not high. Similar factors to those mentioned for Denmark operate here; much of the oilseed imported comes from the Netherlands Indies. Of the other countries included in Table XII, special reference need be made

only to France and the United States, where consumption is very low. In certain parts of France, olive oil is extensively used as such and other vegetable oils are largely used in cooking. The consumption of butter is relatively low. Margarine is used chiefly as a cooking-fat rather than a spread. The low consumption may be due in part to the legislation against colouring.

46. The relationship between butter consumption and margarine consumption is an interesting and important subject worthy of more detailed analysis than it has hitherto received. It has been shown above that, during the past generation, the consumption of both has increased in several countries; it would appear, therefore, that the demand for edible fats is elastic in terms of income and *per caput* consumption tends to rise with increasing wealth. The type of fat used appears to depend upon conditions of production and upon purchasing power in relation to the relative prices of the various substitutes. The price of butter is of particular importance; when it fell in recent years, there was in most countries a considerable substitution of butter for the less nutritive margarine.¹

Vegetables.

47. Recent nutrition teaching has attached special importance to increasing the consumption of vegetables, particularly green leafy vegetables, such as spinach, cabbage, salads, etc. They are rich in the B vitamins and in vitamin A, and are among the most important sources of the anti-scorbutic vitamin C; they are very rich in important minerals.

48. Estimates of vegetable production and consumption are notoriously unreliable. Even where the area under vegetables is known, the yields vary a great deal from year to year, so that estimates of output based on area are subject to an unusually wide margin of error. Moreover, the recorded statistics of area under vegetables generally exclude kitchen-gardens; in the case of vegetables, a small plot of ground intensively cultivated has a very large yield, so that the omission is important. Under the

¹ Compare the recent movement of butter and margarine consumption shown in Table X and XII above. See also Chapter 5, Table XVI, below. In the United Kingdom between 1924 and 1934, margarine consumption fell by one-third, while butter consumption increased by 57%; these movements coincided with a fall in the price of butter of 48% (cf. ORR: "Food, Health and Income", page 18).

pressure of necessity during the war, the practice of keeping vegetable gardens in villages and even cities as well as on farms was stimulated in almost all countries. This practice survived after the war (although the growing urbanisation of certain countries has, perhaps, tended to limit its importance) and undoubtedly resulted in an improvement in the quality of the diet.

49. After making all necessary allowances for the imperfection of the statistics, there remains no doubt that, since the war, there has been a very large increase in the consumption of vegetables in all Western countries. The nutritive qualities of this food have been increasingly recognised. Production has tended to become more specialised, qualities have been standardised, transport facilities improved and marketing better organised. In addition, these factors, together with the development of particularly early- and late-maturing strains, have contributed much towards the reduction of seasonal fluctuations in the consumption of vegetables. Special mention must be made of the work of the Producers' and Consumers' Co-operative Organisations in improving the quality of fruit and vegetables marketed. ¹ In all these fields, however, much remains to be done, as will be shown later.

50. A few examples may be quoted to illustrate the recent increase in the consumption of vegetables. In the United States, figures are available for car-lot shipments of the principal vegetable crops by years since 1920. These figures do not include shipments by motor, which have become increasingly important, so that they probably understate the rate of increase of consumption.

Table XIV.
CAR-LOT SHIPMENTS OF VEGETABLES IN THE UNITED STATES.^a

	Snapbeans	Carrots	Celery	Cucumbers	Lettuce
1920	1,473	1,602	10,859	3,689	13,788
1925	5,133	3,427	20,514	8,492	36,509
1930	9,559	12,392	25,490	7,663	55,718
1935	10,076	12,384	19,111	5,279	45,669
	Onions	Green Peas	Potatoes	Spinach	Tomatoes
1920	29,473	—	185,176	2,891	18,394
1925	30,796	2,707 ^b	241,523	7,919	28,254
1930	40,281	7,294	252,411	9,636	33,578
1935	30,467	7,966	201,893	5,606	23,318

^a Taken from U.S. Department of Agriculture Year-Books of Agriculture and Agricultural Statistics.
^b 1926.

¹ International Labour Office: "The Co-operative Movement and Better Nutrition". Studies and Reports, Series B, No. 24. Geneva, 1937.

The annual *per caput* consumption of vegetables other than potatoes is estimated ¹ to have risen from 58 kg. in 1919/20-1923/24 to 69 kg. in 1934/35, while the consumption of potatoes fell slightly. In the United Kingdom, the consumption of fresh vegetables other than potatoes it estimated ² to have risen from 27.2 kg. per head in 1909-1913 to 35.4 kg. in 1924-1928 and 44.5 kg. in 1934; consumption of potatoes shows little net change. The consumption of fresh vegetables other than potatoes was estimated ³ at nearly 54 kg. *per caput* in Germany in 1927, and about 43 kg. *per caput* for the city population. For the post-war period, there was a significant increase in the consumption of tomatoes, lettuce, cauliflower and cucumbers; on the other hand, consumption of cabbage shows no increase and consumption of potatoes a slight decline. In France, as in other countries, there has been an increase in the variety of vegetables consumed. Tomatoes have become increasingly popular, endives are cultivated as well as imported in large quantities and more beans are eaten than before the war. In some of these countries (and no doubt the same is true for others for which statistics are not available), vegetables have come to be used less as a source of energy than as a source of refreshment. This explains in part the increase in consumption of tomatoes, lettuce, celery and cucumbers, and the decline or stability in the consumption of potatoes and other bulky vegetables. It is worthy of note that the vegetables whose consumption has increased most require little, if any, time in cooking, which has no doubt been an additional factor in popularising their use, particularly where the housewife is also a wage-earner. The growth of the canning industry has also played an important part in this connection.

Fruit.

51. One of the most remarkable and encouraging changes in consumption habits since the beginning of this century is the very large increase in the use of fruit. The significance of this develop-

¹ U.S. Dept. of Agriculture, Bureau of Agricultural Economics: "Looking Forward on Agricultural Policy" (Washington, 1936).

² A. W. FLUX, *op. cit.*; and J. B. ORR: "Food, Health and Income" (London, 1936).

³ *Berichte über Landwirtschaft*, Vol. 69 — "Gemüse, Obst und Südfrüchte im Deutschen Reich", by Dr. Ludwig SAMUEL (Berlin, 1933).

ment from a nutritional standpoint is scarcely to be overrated. Along with milk and vegetables, certain fruits rank high in the list of protective foods, being important sources of vitamins and mineral elements.

52. The increased consumption of the citrus and other sub-tropical fruits is especially striking. The high medicinal value of the lemon has long been known; its antiscorbutic qualities were responsible for the provision in the British Merchant Shipping Act (1867) requiring ships sailing for countries where lemon or lemon-juice is not available to carry enough lemon-juice to provide each member of the crew with 1 oz. per day. The orange was introduced into South-Western Europe much later than the lemon and its cultivation lagged much behind. International trade in oranges developed later than that in lemons, only beginning towards the middle of the nineteenth century; the grapefruit was practically unknown until the present century.

53. The following table shows the world trade in citrus fruits and in bananas in 1928-1930, compared with before the war:

Table XV.

WORLD TRADE IN CITRUS FRUITS AND BANANAS.^a

Yearly average	Oranges and mandarines	Lemons	Other citrus fruits	All citrus fruits	Bananas
In thousands of quintals					
1909-1913	8,079	2,735	17	10,831	9,553
1928-1930	13,634	2,774	504	16,891	21,044

^a Taken from *Berichte über Landwirtschaft*, Vol. 68 — "Weltproduktion und Welthandel an frischen Südfrüchten", by RITTER and GUTTFELD (Berlin, 1933).

The statistics for individual countries show that the consumption of sub-tropical fruits has increased most, and is highest, in the United States of America, the British Dominions, the United Kingdom and the countries of Western Europe.¹ The development in the United States is shown in the following table:²

¹ The consumption of oranges and tangerines is also relatively high in Japan.

² Taken from U. S. Department of Commerce, Domestic Commerce Series, No. 38: "Apparent *Per Capita* Consumption of Principal Foods in the United States" (Washington, 1930).

Given in pounds in the original; converted into kilogrammes at the rate of 1 lb. = 0.4536 kg.

Table XVI.

Per Caput CONSUMPTION OF CITRUS FRUITS AND BANANAS
IN THE UNITED STATES.

	1899 Kg.	1909 Kg.	1926 Kg.
Oranges	3.0	6.5	9.8
Lemons	1.4	1.8	2.4
Grapefruit	—	0.4	2.5
Bananas	5.7	9.2	10.4

The large increase in the consumption of the citrus fruits went hand in hand with an educational campaign of the medical profession and extensive advertising on the part of the distributors. In the United Kingdom, the same tendency is apparent, as is shown in the following figures of imports:

Table XVII.

IMPORTS OF CITRUS FRUITS AND BANANAS
INTO UNITED KINGDOM.^a

	1909-1913	1924-1928	1929-1933	1935
		In thousands of tons		
Oranges	283	389	508	513
Grapefruit	—	13	36	60
Lemon and other citrus fruits	43	62	75	67
Bananas	102	190	240	305

^a Data from Imperial Economic Committee: "Fruit Supplies in 1935" (London, 1936).

Changes in German imports of oranges, lemons and bananas since before the war are shown below.

Table XVIII.

IMPORTS OF CITRUS FRUITS AND BANANAS INTO GERMANY.^a

	1911-1913	1930-1932	1933-1935
	In thousands of tons		
Oranges	137	284	254
Lemons	37	72	69
Bananas	36	112	86

^a Data from Imperial Economic Committee: "Fruit Supplies in 1935" (London, 1936)

In spite of the decline during quite recent years, orange and lemon imports were nearly twice as great in the last period shown, and banana imports more than twice as great as before the war. Examples of the same tendency could be multiplied. Thus, the average *per capita* consumption of oranges in the Netherlands rose from 2.6 kg. (including mandarines) in 1902-1906 to 9.35 kg. (excluding mandarines) in 1933; and of lemons, from 0.54 to 0.91 kg.¹ In 1913, Sweden imported 6.25 million kg. of oranges; in 1929, she imported 15.5 million kg. and, in 1934, 34.8 million kg. Imports of bananas rose from 1.15 million kg. in 1913 to 13.3 million kg. in 1929, and then fell back to 7.3 million kg. in 1934. Belgian imports of exotic fruits, which had already risen from 12,000 to 31,000 tons between 1900 and 1913, amounted to 60,000 tons in 1929 and 117,000 in 1931. In recent years, the French consumption of citrus fruits has also increased remarkably; since 1929, imports of oranges have more than doubled.

Table XIX.

IMPORTS OF CITRUS FRUITS AND BANANAS INTO FRANCE.^a

	1929	1932	1935
	In thousands of tons		
Oranges	103	198	222
Mandarines	26	39	40
Lemons	19	24	29
Bananas.	126	221	152

^a Data from Imperial Economic Committee: "Fruit Supplies in 1935" (London, 1936).

54. The underlying strength of the tendency towards greater consumption of citrus fruits in Western and Central Europe is shown in the fact that, in most countries, the movement continued even after the economic depression set in in 1929. The estimated *per capita* consumption of citrus fruits and bananas² in 1925-1929 and 1930-1934 is shown below.

¹ Data from "Jaarcijfers voor Nederland" issued by Centraal Bureau voor de Statistiek.

² The dietetic value of citrus fruits and bananas is not identical; they are, however, frequently not separated in trade statistics and are therefore grouped together in Table XX.

Table XX.

ESTIMATED *Per Caput* CONSUMPTION OF CITRUS FRUITS
AND BANANAS.^a

	1925-1929 Kg.	1930-1934 Kg.
United Kingdom	15.6	19.4
Belgium	5.4	12.5
Netherlands	8.9	12.9
France	5.7	11.5
Switzerland	6.7	10.7
Norway	7.2	9.5
Sweden	4.0	6.9
Germany	5.5	7.0
Denmark	4.3	5.5
Czechoslovakia	2.1	3.1

^a Data from League of Nations: "The Problem of Nutrition", Vol. IV — "Statistics of Food Production, Consumption and Prices", documentation prepared and revised by International Institute of Agriculture (Geneva, 1936).

Given in pounds in the original; converted into kilogrammes at the rate of 1 lb. = 0.4536 kg.

55. Consumption of citrus fruits and bananas is very much smaller in the countries of Eastern and South-Eastern Europe. In Poland, where there was for many years an import prohibition on oranges, consumption of citrus fruits and bananas was only 0.6 kg. per head per year in 1925-1929 and 0.5 kg. in 1930-1934. In Yugoslavia, the consumption of citrus fruits and bananas was 0.8 kg. in 1925-1929 and 0.7 kg. in 1930-1934. The Union of Soviet Socialist Republics imports practically no southern fruits. In these countries, as well as in Lithuania and Bulgaria, the consumption of lemons (chiefly as an adjunct to tea) is as high as, or higher than, the consumption of oranges.

56. In the great majority of countries, the increase in the consumption of citrus fruits in recent years has not taken place at the expense of other fresh fruit. On the contrary, there is every indication that the consumption of fresh fruit has also risen markedly and perhaps over an even wider area. Unfortunately, with the statistics at present available,¹ it is not possible to make an

¹ Few countries publish annual figures of fruit production, and for those that do so it is impossible to determine to what extent the figures include fruit grown in private gardens, whether attached to farmhouses or private dwelling-houses. Moreover, the task of estimating fruit consumption is complicated by the utilisation of wine grapes for consumption as fruit and by the practice of distilling or drying other fruits, especially plums. Figures of apple and pear production may include cider fruit to an unknown extent.

accurate estimate of the *per caput* fruit consumption in a large number of countries; it is to be hoped that improvements will be effected in this respect in the near future. The upward trend is, however, unmistakable. During the past decade, there has been a strong development of interest in fruit-growing and an increase in almost all the countries in the amount of land under orchard. In addition, even in those few countries where aggregate production has not increased (or, perhaps better, where no increase is recorded in the official statistics), there has been a considerable increase in the production of commercially marketable fruit. In addition to the growth of farm orchards, there has been a marked development of commercial orchards in many countries; the trees have been more carefully tended; varieties have been adapted to modern marketing requirements and the average level of quality has been much improved.

57. The fact that the average *per caput* consumption of fresh fruit has increased substantially during the present generation forms so striking a part of ordinary experience that it hardly requires the confirmation of statistical evidence. In the next chapter, figures are given to show the large increase in the production of fruit in recent years. For the present, it will suffice to quote a few typical examples of changes in *per caput* consumption.

Thus, in Great Britain and Northern Ireland, the total supplies of fruit available for consumption (not including cottage-garden produce and consumption on farms) was 1,864,000 metric tons in 1924-1928 compared with 1,271,000 metric tons in Great Britain and Ireland in 1909-1913.¹ As the population was the same in the two periods,² this represents an apparent rise of nearly 50% in *per caput* consumption—from 27.7 kg. to 41.3 kg. per head. The available statistics³ suggest a further increase of the consumption of fresh fruit of more than 15% between 1924-1928 and 1934. In the United States, although to some extent at the expense of apple consumption, the consumption of other fresh fruit increased from about

¹ Data from A. W. FLUX: "Our Food Supply before and after the War" in *Journal of Royal Statistical Society*, 1930.

² It should be noted that the pre-war figures relate to Great Britain and Ireland and the post-war figures to Great Britain and Northern Ireland, thus excluding the Irish Free State. See footnote ² on page 106 above.

³ Imperial Economic Committee: "Memoranda on Fruit Supplies".

23 kg. per head at the beginning of the century to nearly 45 kg. per annum in 1923-1927.¹ The consumption of grapes in France has doubled within the past ten years and the consumption of other fresh fruit rose from 3 to 4 million quintals in 1913 to over 10 million quintals in 1935. Consumption per head of fresh fruit in France is to-day two or three times as high as before the war. In Italy, the consumption of fresh fruit other than citrus fruit, which was privately estimated² at 16 kg. per head in 1910-1914, is officially estimated³ at 28 kg. per head in 1926-1930 and 38 kg. per head in 1931-1934. The pre-war figures are not directly comparable with the more recent ones, but there seems little doubt that the upward trend disclosed since 1926 was already under way before that year.

58. Not only have people been eating more fruit in recent years than formerly, but they have also been able to spread their increased consumption more evenly throughout the year. This partial elimination of seasonal fluctuations in fruit consumption represents distinct progress towards better nutrition. It has been accomplished through an extension of the area from which fruit supplies are drawn, through development of the technique of refrigeration and the speed of transport and through the growth of the canning industry. It must be observed, however, that preservation by the ordinary canning process generally eliminates the ascorbic acid (vitamin C) found in fresh fruit; but this fact, if recognised by the manufacturers, can be overcome by the addition of synthetic ascorbic acid.

One example will be sufficient to show the importance of new sources of supply in reducing seasonal variations in fruit consumption. Twenty-five years ago, it was virtually impossible to buy oranges in Europe between the end of April and the beginning of December; to-day, with the extension of cultivation to the southern hemisphere, they are obtainable the whole year round. Hitherto the United Kingdom has been the chief European market for summer oranges. In 1935, for example, that country imported 40% of her total imports of oranges during the seven-month period from May to November, while France imported 25% of her total imports and Germany less than 10% of hers during these months.

¹ U.S. Department of Commerce, *loc. cit.*

² Estimate of Dr. Lorenzo SPINA quoted in *Annuario Statistico Italiano*, 1935.

³ *Annuario Statistico Italiano*, 1936.

C. GENERAL SUMMARY OF CONSUMPTION TRENDS.

59. The principal facts which emerge from the preceding detailed analysis can be briefly summarised. In all Western countries, the average diet of the population has become increasingly diversified during recent decades. There has been a tendency (stronger in some countries than others, but everywhere present) for the consumption of dairy products, eggs, fruit and vegetables to increase; and the great staples, such as cereals and potatoes, have come to constitute a smaller proportion of human foodstuffs. The fact that a larger proportion of total calorie requirements has been derived from the highly protective foods represents a great nutritional advance and shows that there is a natural tendency on the part of consumers to act upon their better knowledge of the importance of rational nutrition so far as economic circumstances permit. The only important tendency disclosed in the detailed analysis which can be regarded as an exception to this general statement is the increasing consumption of sugar in certain countries where the level of consumption is very high.

60. Figures relating to the average consumption of the entire population are, of course, not necessarily typical for different income and population groups. It is shown in Chapter 5 that there are very wide differences in the consumption of certain foods by families with different incomes per head. These differences are necessarily concealed in a national average. The true significance of an average figure differs considerably for the various products; it is greater, for example, for cereals and potatoes than for meat, vegetables and other protective foods, the consumption of which is known to be much higher in families of high incomes than in those where means are restricted.

61. The data available, however, suggest that all classes have shared in the general improvement in dietary habits. A few examples will illustrate the improvement in workers' diets. A study¹ has recently been made of the food habits of relatively small groups of

¹ Medical Research Council, Special Report Series, No. 218: "A Dietary Survey in Terms of the Actual Foodstuffs consumed", by E. P. CATHCART and A. M. T. MURRAY (London, 1936).

working-class families in Glasgow in 1911 and 1933; average income per head was about the same in the two periods, account being taken of the rise in the cost of living. In 1933, three-quarters of the families ate fresh fruit, while none did in 1911. In 1933, three-quarters of the families ate leafy vegetables, while less than half did in 1911. More families also ate eggs in the later year, but, on the other hand, consumption of fresh milk fell and butter tended to be displaced by margarine.

A more satisfactory comparison of working-class diets in different periods can be made for Belgium, where various official budgetary studies have been carried out since before the end of the last century. According to these surveys,¹ the average monthly consumption of an adult male² has changed as follows:

Table XXI.

EVOLUTION OF FOOD CONSUMPTION OF FAMILIES OF MANUAL WORKERS
IN BELGIUM.

(Consumption per adult male per month.)

	1891 Kg.	1910 Kg.	1921 Kg.	1929 Kg.	1929 as % of 1891
Beef	1.84	1.51	2.12 ^c	1.83	99.5
Pork	0.20	0.85	0.73	0.68	338.6
Bacon	0.41	0.76	0.69	0.64	154.8
Fat	0.32	0.95	0.78	0.47	147.2
Eggs	0.37	0.65	1.09	0.84	255.1
Milk	3.95	6.91 ^a	9.29	12.09	318.1
Butter	1.27	1.38	1.87 ^d	1.91	149.7
Bread	21.29	20.22	19.52	16.73	78.5
Potatoes	19.33	21.80	21.48	18.72	96.8
Coffee	0.45	0.59	0.72	0.57	126.1
Chicory	0.45	0.44	0.62	0.48	108.8
Sugar	0.20	0.50 ^b	1.50	1.25	620.8

^a Whole milk.

^b Lump sugar.

^c Fresh and frozen meat.

^d Butter and margarine.

¹ See Max GOTTSCHALK: "Budgets ouvriers en 1891 et en 1929", in *Revue sociologique*, 1931, and the "Purchasing Power of Belgian Workers", in *International Labour Review*, June 1932.

² For the scale of nutritive requirements according to age and sex used in these studies, see Chapter 5, page 241, scale *b* (1 adult male = 3.5 consumption units).

The most notable trends (apart from the remarkable increase in sugar consumption) are the continuous rise in the consumption of milk, butter and eggs, the steady fall in bread consumption and the post-war decline in the consumption of potatoes. Figures available for food expenditure show that the percentage spent on vegetables other than potatoes doubled between 1891 and 1929 (from 2.4 to 4.8%) and that considerable amounts were spent on fruit in 1929, while none reached the worker's table in 1891. In considering these figures (and those given later in this paragraph), it should be borne in mind that 1929 (and the preceding years) represent a period of relative prosperity, when it might be expected that workers would be in a position to buy unusually large amounts of the higher-priced foods. There appears, however, little reason to doubt that the principal changes shown do indeed reflect genuine long-run changes in food-consumption habits. For the superior diet of 1929, the Belgian worker had to pay out a smaller fraction of his total income than his father paid in 1891. The relative increase in the consumption of the protective foods was particularly striking for the workers with the lowest incomes, though the absolute amount of their consumption remained, of course, lower than that of the better-paid workers.

Recent trends in food habits of industrial workers in Sweden are illustrated in the following figures, which show the annual consumption per consumption unit¹ of families covered by the budgetary enquiries of 1914, 1923 and 1933:

Table XXII.

EVOLUTION OF FOOD CONSUMPTION OF MANUAL WORKERS IN SWEDEN.
(Consumption per consumption unit per year.)

		1914	1923	1933
Meat	kg.	25.9	27.3	27.7
Full milk	litres	196.2	254.2	225.1
Skim milk.	litres	68.3	18.1	7.9
Butter	kg.	9.6	11.1	11.7
Margarine	kg.	6.2	6.4	10.9
Eggs	number	134.2	189.1	241.5
Bread, flour, etc.	kg.	135.3	124.5	100.5
Potatoes	kg.	94.5	117.2	105.2
Sugar	kg.	25.5	30.3	36.5

¹ For scale used in computing consumption units, see page 241, scale *d*.

Attention is especially directed to the steady increase in the consumption of eggs and butter. The consumption of full milk was very much higher in 1923 than in 1914, but fell somewhat in the next decade. Figures for fruit and vegetable consumption are not available, but there is no doubt that much larger quantities of these foods are eaten now than before the war.

Official budgetary enquiries conducted among the working population of Oslo before and after the war give the following data for annual consumption per consumption unit: ¹

Table XXIII.

EVOLUTION OF FOOD CONSUMPTION OF MANUAL WORKERS IN NORWAY.

(Consumption per consumption unit per year.)

		1912/13	1927/28
Meat	kg.	36.2	55.6
Fish	kg.	24.9	53.0
Full milk	litres	86.5	158.3
Skim milk	litres	103.6	33.8
Butter	kg.	7.6	3.5
Margarine	kg.	14.5	23.7
Eggs	kg.	4.8	11.5
Bread, flour, etc.	kg.	162.3	135.7
Potatoes	kg.	79.5	98.8
Other vegetables	kg.	9.4	20.6
Fresh domestic fruit	kg.	2.8	3.8
Oranges, etc.	kg.	4.2	12.2
Sugar	kg.	20.4	25.4

The superiority of the post-war diet is apparent; especially noteworthy is the large increase in the consumption of full milk, eggs, vegetables other than potatoes and southern fruit.

The average daily consumption of industrial workers ² in Germany before and after the war has been estimated ³ as follows:

¹ For scale used in computing consumption units, see page 245, scale *d*.

² For scale used in computing consumption units, see page 245, scale *k*.

³ From Carl von Tyska: "Ernährung und Lebenshaltung des Deutschen Volkes" (Berlin, 1934).

Table XXIV.

EVOLUTION OF FOOD CONSUMPTION OF MANUAL WORKERS
IN GERMANY.

(Consumption per adult male per day.)

		1907/8	1927/28
Meat	grammes	90-100	126
Milk	litre	$\frac{1}{3}$ - $\frac{1}{2}$	$\frac{1}{2}$
Butter	grammes	30	16
Other fats	grammes	10-15	39
Eggs	number	$\frac{1}{3}$ - $\frac{1}{2}$	$\frac{1}{2}$
Cheese	grammes	10-15	13
Fish	grammes	—	18
Bread	grammes	450	307
Potatoes	grammes	500	421
Vegetables	grammes	—	85
Sugar	grammes	...	45
Calories		2,900-3,500	2,866

The pre-war figures are stated to be less reliable than those for 1927/28, which are taken from the official budgetary enquiry. Apart from the fall in butter consumption, the changes which are suggested by the above table are in the direction of a more varied and better balanced diet.

62. It is clear, from the examples given in the preceding paragraph (which do nothing more than confirm the evidence of general observation and experience), that the average diet of the urban working-classes of Western countries has tended, in post-war years, to include larger amounts of the "protective" foods. The same is undoubtedly true of Western agricultural communities. Thus, there has been a substantial rise in the meat consumption of agricultural labourers in France and the United Kingdom since the war, and this increase is but one aspect of an all-round improvement in the dietary. In Belgium, at the beginning of the present century, workers lived largely on bread and potatoes; only very small quantities of meat and butter were eaten and little or no fruit or vegetables. To-day, meat is eaten at least once a day, butter twice a day and vegetables daily.¹ According to the farm

¹ DELOS: "Traité d'économie rurale" (Brussels, 1934).

accounts furnished to the Swiss Peasants Union, consumption on farm households shows considerable changes since before the war: milk consumption per "adult male" rose from 422 litres in 1911 to 475 litres in 1932; meat consumption from 53 to 64 kg.; and the consumption of potatoes fell from 277 to 224 kg. In Sweden, official studies of the food habits of agricultural workers carried out in 1920 and 1933 gave the following data on annual consumption per "normal household" (3.3 consumption units)¹:

Table XXV.

EVOLUTION OF FOOD CONSUMPTION OF AGRICULTURAL WORKERS
IN SWEDEN.

(Consumption per normal household per year.)

		1920	1933
Meat	kg.	89.2	98.8
Herrings	kg.	28.4	15.5
Whole milk	litres	866.6	895.2
Skim milk.	litres	440.6	234.3
Butter	kg.	25.7	23.2
Margarine	kg.	6.6	33.4
Cheese	kg.	5.0	14.6
Eggs	number	264	535
Bread, flour, etc.	kg.	562.0	508.5
Potatoes	kg.	597.3	568.5
Coffee.	kg.	16.2	17.6
Sugar	kg.	80.5	120.9

63. Accurate statistical data regarding the food-consumption habits of the salaried and professional groups are not readily available, but there is no doubt that, during recent decades, increasing attention has been paid to the nutritive properties of different foods and the diet has become better balanced and more rational. An interesting illustration of the effect which the spread of knowledge concerning the correct principles of nutrition can have on food habits is provided in a recent survey² of the diet of school-boys at Christ's Hospital, an English boarding-school, at different dates. The consumption of different foods per boy per day in 1913 and 1932 is shown below.

¹ For scale used in computing consumption units, see page 245, scale *d*.

² FRIEND and SCHULTZ: "The School-boy" (London, 1935).

Table XXVI.

EVOLUTION OF FOOD CONSUMPTION IN AN ENGLISH
BOARDING-SCHOOL.

	(Consumption per boy per day.) ^a	
	1913 Kg.	1932 Kg.
Bread	0.370	0.270
Jam, sugar, syrup	0.054	0.112
Fresh vegetables and fruit	0.070	0.150
Meat (fresh)	0.170	0.161
Corned beef	—	0.016
Bacon	0.022	0.016
Sausages	0.013	0.013
Fish	0.037	0.039
Fish-cake	—	0.012
Meat-pie	—	0.009
Eggs	—	0.003
Milk (pints)	0.152	0.337
Butter	0.035	0.040
Cheese	0.006	0.006

^a Given in pounds in the original; converted into kilogrammes at the rate of 1 lb. = 0.4536 kg.

The outstanding features of this comparison are the increased stress placed on the consumption of milk and fresh fruit and vegetables, and the consequent decline in bread consumption. The 1932 diet is more varied than the pre-war diet and richer in all the essential nutritive elements.

64. It is, perhaps, worth observing at this point that, if the preceding analysis makes it clear that the diet of most Western countries has improved very considerably during the past twenty or thirty years, and if it shows that consumption habits have been tending to change along the right lines, it affords nevertheless no grounds for complacency. Evidence is adduced later in this report to show that, even in those countries where the improvement in dietary habits has been most marked, the diet of a substantial portion of the population remains deficient in essential nutritive elements. A problem of malnutrition unquestionably exists even in the countries of highest general planes of living, and in others less fortunately placed the evil is more widespread.

65. The examples quoted in the preceding discussion of consumption trends have been largely drawn from the United States,

the British Empire, and the States of Western and North-Western Europe; little has been said about the trend of consumption in Central or Eastern Europe. The statistical data relating to these countries are too incomplete to permit of any generalisations.

From such partial indications as are available, it would seem that (in the towns, at any rate), the trend of consumption is broadly similar to that observed in Western countries—namely, towards a greater consumption of fresh fruit, vegetables and dairy products. Thus, in Latvia, the *per caput* consumption of milk and dairy products increased by nearly 30% between 1930 and 1935; alcohol consumption has fallen very notably. The *per caput* consumption of eggs increased by nearly two-thirds between 1929 and 1934. The number of fruit-trees is constantly increasing and so also is the cultivation of vegetables, particularly greenhouse vegetables (tomatoes, green salads, lettuce, radishes, etc.), in the neighbourhood of Riga. The same tendencies appear to prevail in the other Baltic States.

In Poland, the consumption of milk and milk products, though still low, appears to be increasing; it is estimated to have risen from 182 litres per head in 1927-1929 to 227 litres in 1930-1934. In Roumania, the consumption of eggs is estimated to have risen from about 80 per head in 1926/27 to 110 per head in 1933; the rise was partly due to the loss of export markets. The number of fruit-trees has grown in recent years, and the production of vegetables increased by nearly a third between 1927 and 1933. Natural conditions for these crops are favourable and there is reason to believe that great progress could be made along these lines.

In Yugoslavia, the area under fruit (other than plums) and vine and under vegetables has been tending to expand. Statistics available for Zagreb suggest that, during the past quinquennium, there has been a slight but noticeable increase in *per caput* consumption of fruit and vegetables in that city; it is believed that, through educational means, the production and consumption of these foods by the population in country districts could be greatly increased. In Bulgaria, a successful attempt has been made to encourage fruit cultivation, and the area under fruit has increased remarkably during the past decade. The area under vegetables has also increased and *per caput* consumption appears to have risen by about 50%. At the same time, the consumption of meat in the principal towns has shown an upward movement.

66. The figures quoted in the preceding paragraph must, however, be treated with reserve. In these countries, the peasants constitute the bulk of the population and live on what they produce themselves. What is consumed on the farms frequently escapes the recorded production statistics. Rural habits of consumption change less rapidly than urban. They are more dependent on local production, and the food consumed in country districts is often less varied, less refined and more bulky than that consumed in the towns. Generally, one or at most two staples constitute the bulk of the diet; and, when economic circumstances permit, an increase in consumption is directed in the first instance towards more of the same foods rather than towards different foods.

The problem of influencing the food habits of the bulk of the population of the peasant States of Europe is therefore different from that encountered in Western countries.

D. FACTORS DETERMINING OBSERVED TRENDS IN FOOD-CONSUMPTION HABITS.

67. The changing content of the diet of Western countries is not an accident; it corresponds to a genuine change both in physiological requirements and in the power to satisfy them. The principal cause of this change is the reduction in the expenditure of muscular energy brought about, on the one hand, by the increased mechanisation of industry and agriculture and the reduction in hours of work and, on the other hand, by the rise in the proportion of the population engaged in commerce, trade, clerical work and other quasi-sedentary occupations. Simultaneously this mechanisation of production has increased output per head and raised the purchasing power of all classes of the population.

68. By and large, labourers doing heavy manual work obviously spend more energy than do machine-tenders or office-workers; the energy spent in work must be provided by food, and it is natural that the substitution of machinery for manual work should be reflected in changed habits of food consumption. The growing mechanisation of industry is so important a part of the ordinary experience of our times that it is not necessary to insist further on the point. Closely connected with it is the change in the

occupational distribution of the gainfully employed population of almost all countries. An ever smaller fraction of the population is engaged in the primary industries of agriculture, forestry, etc., and a constantly increasing proportion in manufacturing, trade, transportation, clerical and professional occupations.

In the United States of America, for example, the percentage of gainfully occupied persons of 16 years and over engaged in agriculture and allied occupations fell from 41.2 in 1890 to 21.3 in 1930, while the percentage engaged in trade and transportation, clerical service, domestic and personal service, public and professional service rose from 30.7 to 48.1.¹ In the United Kingdom, the percentage of the occupied male population over 10 years of age engaged in agriculture is estimated² to have fallen from 12 to 7% between 1891 and 1931, while the proportion engaged in transport, occupations other than general industry, and unoccupied rose from 34 to 51%. In France, the proportion of the productive population engaged in agriculture, forestry and fishing fell from 45% in 1906 to 37% in 1931, while the proportion engaged in trade, professional and public service rose from 18.7 to 22.3%.³ In Germany, 36.4% of the production population were engaged in agriculture in 1895 and 28.9% in 1933; trade and transport and public and administrative service accounted for 17.6% at the end of the century and 26.8% in 1933.³

Not only is agricultural work more arduous than the work connected with trade and transportation, clerical service and the professions (the relative importance of which increased notably), but to a large extent it is performed out of doors at all seasons and therefore requires greater food consumption to maintain constant body temperature as well as to provide more muscular energy. Furthermore, the introduction of mechanical methods has tended to replace physical labour in agriculture as well as in industry in Western countries, so that the average agricultural worker now probably expends less muscular energy than did the average agricultural worker of forty years ago.

¹ Figures compiled from "Recent Social Trends", Report of the President's Research Committee (New York and London, 1933).

² *Economist* (London), November 3rd, 1934.

³ Official census records.

69. In addition to the growing mechanisation of industry and the changed occupational distribution of Western countries, other influences have also had their effect on food requirements. The improvement in housing has reduced the amount of food required to keep the body at a constant temperature. The increased use of automobiles and the development of rapid transport within cities and towns had reduced the amount of walking. Less energy is spent in moving about, and less food is required to provide the energy for this purpose. On the other hand, the growing vogue of outdoor sports and physical exercise involves an increase in muscular effort and exposure to cold.

70. Changes in the character of work and life in modern civilisation have resulted, then, in changes in food requirements. It has been shown above that the general tendency of consumption has been to adapt itself to these changed requirements—less of the staple foods of high energy value are eaten, and more of the lighter fruits and vegetables and more dairy products. It remains now to indicate briefly how this change in food habits was possible. The foods which have tended to figure more largely in the diet are more expensive than those they have displaced and the modern diet of Western countries, better adapted though it is to the changed circumstances, undoubtedly costs more than the diet of forty years ago.

71. To answer this question in detail would be to write the economic history of the standard of living—a task which clearly cannot be undertaken here. It will suffice to state that the same factors which changed food requirements in Western countries simultaneously tended to provide the increased purchasing power necessary to buy the more expensive diet. The mechanisation of industry raised the productivity of labour; capital formation and technical progress made possible a higher output of goods of all kinds. The exchange of goods was facilitated by important developments in transport, national and international, and in credit systems. The growth of international trade—up to 1929—reduced the importance of national sources of supply.

72. This general growth in national income has been reflected in higher real wages of almost all classes of industrial workers. Moreover, in many parts of the world the State has played an

important rôle in improving the economic position of the lower-income sections of the community. Through unemployment insurance, minimum-wage laws, old-age pensions and other social services, the working-class income of many countries has been substantially increased and made more secure against cyclical fluctuations. Where this has occurred, it has, no doubt, been an important influence making for better nutrition. In a number of countries, indeed, the State has directly affected the nutrition of certain sections of the population by the direct provision of food, especially to school-children.

73. In addition to the general rise in national income and the tendencies making for redistribution of income in favour of the working-classes, another factor contributing to better nutrition in most Western countries has probably been the decline in the average size of the family. Food resources have, in many countries, tended to become more plentiful in relation to population. In a later chapter ¹ the intimate connection between the size of family and the standard of nutrition is shown in detail.

74. The important part which agriculture has played in the movement towards better nutrition is reserved for fuller discussion in the next chapter. At this point, however, attention may be drawn to one fact of special importance. Much of the improvement in nutrition which has taken place in the past has been due to a gradual or sudden decline in the prices of certain protective foods, which has removed them from the class of luxury products available only to the wealthy and put them within the monetary reach of the mass of consumers. This fall in prices has been due to improvements in the art of production, of processing and distribution, or the deliberate cultivation, through lower prices, of the market represented by the lower-income groups of the community.

A few examples may be quoted to illustrate the point. It has been shown above that, since the beginning of this century, and particularly during the past decade, a remarkable increase has occurred in the consumption of bananas and citrus fruit in most countries of Western Europe. In 1900, a banana was in the nature of a luxury:

¹ See Chapter 5, paragraphs 19 to 24.

a delicacy for adults and a reward for good behaviour in children. In 1900, a banana was retailed in London for twopence; in 1937, for a penny or less. In 1937, the retail price of foods as a whole was 50% higher than at the beginning of the century. Imports of bananas into the United Kingdom rose from an average of slightly more than $2\frac{1}{2}$ million bunches a year in the five years 1900-1904 and about $6\frac{3}{4}$ million bunches in the quinquennium immediately preceding the war to 15 million bunches in 1929 and over 20 million bunches in 1935.

More recently still, the same phenomenon can be observed for grapefruit. As recently as 1930, grapefruit were sold in Geneva at 1.20 to 1.50 francs by the few retailers who handled it. To-day grapefruit in no way inferior in quality are to be found in every grocer's shop at 20 centimes. The retail price of grapefruit in the United Kingdom averaged 6d. in 1920-1923, 5d. in 1924-1928, $4\frac{1}{2}$ d. in 1929 and 3d. in 1935. Imports into the United Kingdom were 1,200 tons in the first period, 13,100 tons in 1924-1928, 27,150 tons in 1929 and 59,500 tons in 1935.

75. Butter is another case in point. It has been shown above that in most Western countries there has been an upward tendency in butter consumption since the beginning of the century and that this tendency was much accelerated after 1929. The upward tendency during the first period must be ascribed partly to the introduction of factory methods of manufacture with the resulting economies of specialisation and large-scale production. The increase since 1929 is largely due to the sharp fall in butter prices, which has resulted in the substitution of butter for less nutritious but cheaper table-fats by the working population of many countries. Between 1929 and 1934, for example, the retail price of butter in the United Kingdom fell by 45% and *per caput* consumption increased by 45%. In France, the retail price fell by nearly 25% and *per caput* consumption increased by 25%.

76. In addition to the economic and technical factors responsible for the trend towards a more varied diet, the education of consumers has also played an important part. Since the development of the "new science of nutrition", public and private agencies in many parts of the world have disseminated among a constantly increasing section of the population a knowledge of the nutritive values of

different foods. This movement has gone farther in some countries than in others. It has, perhaps, reached its highest development in the United States, where various Governmental agencies, the medical profession, private associations and commercial interests have for many years been urging the public to eat more fruit, more vegetables and to drink more milk on account of their special nutritive properties.

If progress in education in other countries has been less sensational, it has nevertheless been substantial. During the past decade, the public health authorities of almost all European States have laid growing stress on the dissemination of nutritional knowledge among all classes of the population. The efforts of the public authorities in this direction have in many cases been ably assisted by private organisations. The amount of space which the newspapers of the United Kingdom, the British Dominions and the Continent of Europe now devote to the discussion of food problems and values and to the publication of balanced menus is a striking testimony to the growth of public interest in these questions.

77. Though much has already been accomplished towards the education of the consumer, a great deal remains to be done. Every fresh enquiry into the nutritional state of a population shows that, with the same money expenditure on food, some housewives are able to provide a diet of far greater nutritive value than others. In all sections of the community, education in the principles of nutrition—adopted to individual circumstances and taking due account of dietary habits and preferences—could do much to raise the level of nutrition.

78. The question of education is treated in detail later in this report.¹ Here it is sufficient to show, by means of a few examples, the degree to which ignorance either of the importance of nutrition to health or of the principles of correct nutrition continues to militate against rational food habits, even in countries where most progress has been made. An outstanding case is the use of white bread. During the past fifty years, the use of white bread of fine texture has become increasingly general among all sections of Western communities; in some countries, a social stigma has even come to be attached to the consumption of coarser bread. The

¹ See Chapter 6.

processes of milling were changed for this and other reasons (for example, the fact that white flour keeps better than less highly milled flour), in order to remove from the grain anything which would give the bread a dark colour or a coarse texture. This involved removing the bran and the germ from the grain—precisely those portions of the grain richest in mineral matters, as is shown in the following table:

Table XXVII.
MINERAL COMPOSITION BY WEIGHT OF WHEAT
AND WHEAT PRODUCTS.^a

Ash constituents in percentage of edible portion.

	Whole wheat	Wheat flour (white)	Wheat bran	Wheat germ
Potassium	0.473	0.115	1.217	0.296
Sodium	0.039	0.060	0.154	0.722
Calcium	0.045	0.020	0.120	0.071
Magnesium	0.133	0.018	0.511	0.342
Phosphorus	0.423	0.092	1.215	1.050
Chlorine	0.068	0.074	0.090	0.070
Sulphur	0.181	0.177	0.247	0.325
Iron	0.005	0.001	0.008	

^a From H. C. SHERMAN: "Chemistry of Food and Nutrition", Appendix B, Table 61 (4th ed., New York, 1933).

When bread is made with flour that has been excessively milled, much of the valuable mineral elements of the grain fails to find its way into the bread.¹

For those able to afford a liberal diet, an abundance of green vegetables, fresh fruit and milk are more important and richer sources of mineral matter than wheat bran and wheat germ. But where dietaries are found to be deficient, minerals are, as a rule, among the main nutritive elements which fall below standard; the insistence on white bread keeps total mineral intake from being as high as it might be at the same level of food cost. It is of interest to observe that, in the United States, there is now, as a result of education, a reverse tendency away from white bread and towards whole-wheat bread. Moreover, the manufacturers of breakfast cereals have in recent years been tending to add the embryo of the grain to their products on account of its high nutritive value.

¹ Some authorities, including Sir Edward MELLANBY, member of the Mixed Committee, hold that the presence of certain mineral salts in large quantities in cereals prevents the absorption by the body of other mineral salts; it would therefore be necessary to recognise that the figures given in the above table of the amount of mineral matter present do not necessarily reflect accurately the amount which can be absorbed by the body.

79. Meat provides another important illustration of the scope for education. Since the war, there has been an increasing tendency for housewives in Western countries to concentrate on the "superior" cuts of meat, suitable for grilling or rapid roasting, and to neglect the allegedly "inferior" cuts suitable for stewing or boiling. It would appear that the nutritive value of these latter cuts is in many cases not inferior to that of the "prime" cuts. This development is partly due to an increased taste for steaks and chops, and partly to the fact that their preparation requires a minimum of time. The entry of women into industry and the development of interests outside the kitchen has put a premium on foods which can be quickly prepared. The concentration of demand on the "superior" cuts has inevitably resulted in a rise in their price relatively to other cuts; the quantity of the prime cuts on a beast does not change with fashion. The figures given below show the retail prices of various cuts of meat in three different countries before and after the war.

Table XXVIII.
RETAIL PRICES OF VARIOUS CUTS OF MEAT.

<i>United States of America.</i>				
	July 1914	August 1934	August 1936	Percentage change July 1914- Aug. 1936
	(Cents per lb.) ^a			
Sirloin steak . . .	59.5	72.5	84.2	+ 41.5
Plate roast . . .	28.0	22.9	31.7	+ 13.2
<i>Great Britain.</i>				
	July 1914	July 1936	Percentage change July 1914-1936	
	(Pence per lb.) ^a			
Ribs of beef . . .	} British	10	13½	+ 35.0
Thin flank . . .		6½	7	+ 7.7
Leg of mutton . .		10½	15	+ 42.9
Breast of mutton		6½	7¼	+ 11.5
<i>France.</i>				
	July 1914	July 1935	Percentage change July 1914-1935	
	(Francs per kg.)			
Beefsteak	3.80	20.65	+ 443	
Flanks	1.70	7.10	+ 318	
Filet of veal	3.60	21.10	+ 486	
Breast	2.20	9.40	+ 327	

^a 1 lb. = 0.4536 kg.

The table shows that prices of "prime cuts" have risen much more than those of other cuts. It is clear that consumers' preferences have changed; and that with the same money expenditure on meat it is possible to get more food value than is now obtained through concentrating on the "prime" cuts.

80. As a final example of the harmful effects of prejudice and ignorance on food habits, the case of skimmed milk is worth mentioning. Before the war, considerable quantities of skimmed milk were consumed by the industrial working population of European cities. Since the war, more full milk has been consumed, and this is, of course, desirable. But a prejudice appears to have developed against skimmed milk in many countries, which has resulted in a decline in its consumption even by those not able to afford the more expensive full milk. In Sweden, for example, budgetary studies of industrial city and town workers show that the average consumption of whole milk rose from 194 to 223 litres per consumption unit between 1914 and 1933—an increase of 29 litres—while average consumption of skimmed milk fell from 68 to 8 litres—a decline of 60 litres. The same is true of other countries.

It is highly desirable that the consumption of whole milk should increase and every effort should, of course, be made to accomplish that end. But it is unfortunate that the prejudice against skimmed milk has, in certain cases, resulted in a reduction of *total* milk consumption. The special nutritive value of milk lies in its mineral and protein content, and this is in no way reduced through the removal of the butter-fat. On the contrary, pint for pint, skimmed milk contains more calcium, more phosphorus, more sulphur, more iron and more protein (though, of course, fewer calories) than full milk. Skimmed milk is much cheaper than whole milk, as the presence of the butter-fat raises the price, and could fall well within the reach of many who do not now buy full milk in adequate quantities. Even greater advantage is, perhaps, to be obtained from increased consumption of dried skimmed milk, either in cooking or as an addition to liquid whole milk. From the point of view of the consumer, there is no waste attached to dried milk: it is not perishable and its price is not raised through high distribution costs. A widespread understanding of the properties and uses of dried and skimmed milk would be of great advantage to the nutrition of the community.

81. In concluding this summary of the factors responsible for current trends in dietary habits, reference should perhaps be made to the decline in the consumption of alcoholic spirits. The following table shows, in litres of pure alcohol, the officially estimated *per caput* consumption of distilled spirits in various countries in selected years since the beginning of the present century:¹

Table XXIX.

PER CAPUT CONSUMPTION OF DISTILLED SPIRITS.

	1900	1905	1910	1913	1918	1920	1925	1930	1933
Denmark	7.02	6.34	5.65	4.81	1.12	1.54	2.07	2.14	2.19
France	4.58	3.52	3.54	3.92	...	2.01	2.70	2.80	2.61
Germany	4.40	3.70	2.80	2.80	0.60	0.70	0.99	0.75	0.77
Italy	0.62	0.77	0.70	0.67	0.48	1.01	0.63	0.44	0.28
Belgium	4.72	2.83	2.58	2.78	...	1.25	1.44	1.59	1.37
Netherlands	4.11	3.69	2.63	2.60	1.60	2.58	1.10	1.31	1.21
Norway	1.58	1.25	1.61	1.82	...	...	0.25	1.15	0.96
United Kingdom	2.88	2.44	1.50	1.74	0.80	1.22	0.83	0.65	0.56
United States	2.46	2.68	2.70	2.84	1.66	0.42	"	"	"
Sweden	4.35	3.55	3.30	3.45	0.60	3.00	2.20	2.40	2.45

^a Figures not available.

In almost all cases, the post-war figures are much lower than the pre-war. There seems little reason to doubt that the decline in the consumption of spirits has played a part of appreciable importance in the movement towards better nutrition. Its effects on nutrition have been both indirect and direct: indirect, through making purchasing power available for consumption of more nutritious items of diet (though it must be pointed out that the increased taxation of spirits in post-war years has made this influence less important than appears from an examination of the above table) and through helping to raise standards of labour efficiency; and direct, because the light refreshments, such as fruit, fruit-juice, ice-cream, used in place of distilled liquor, frequently have special claims to nutritional virtue.

¹ *Annuaire statistique de la France*, 1935.

Chapter 2.

AGRICULTURE AND NUTRITION.

A. INTRODUCTORY.

1. In the previous chapter, it has been shown that during the past generation certain well-defined changes have taken place in the food-consumption habits of Western countries. The average diet has become increasingly diversified and in consequence better balanced. Consumption of fruit, vegetables and dairy products has almost everywhere shown a marked upward tendency, while the consumption of cereals has tended to decline and, in countries where consumption was fairly high, the average *per caput* consumption of meat has also fallen.

2. The question now arises: How has agriculture adapted itself to these changes in demand? It is hardly necessary to insist on the importance of this question. The success of the present nutrition initiative would involve an appreciable change in the food-consumption habits of all countries. This change will, of course, not take place in a day; it will occur gradually and (it is to be hoped) continuously, as the newer knowledge of nutrition is disseminated over wider groups of the population, as the general level of income rises, and as special action is taken by the State or private associations to improve the nutrition of particular groups of the population. But, even though the change in food habits may be gradual, it may none the less be profound; and it is therefore necessary to consider the capacity of agriculture to adapt itself to the changes in demand which would result from the general adoption of food habits more closely in line with the teachings of the modern science of nutrition. No one would desire that this nutrition endeavour should introduce new elements of instability and maladjustment into a world which can already count too many; least of all would it be desired to introduce factors of instability into the agricultural world, which

is only now beginning to recover from long and difficult years of depression.

3. Fortunately for the purpose of this analysis, the changes which have already taken place in food habits (and which have been traced in detail in the previous chapter) are, for the most part, changes in the right direction. The movement towards better nutrition does not, therefore, involve the initiation of new and revolutionary processes, but rather the acceleration and facilitation of processes already in being. Valuable light will therefore be thrown on the capacity of agriculture to adapt itself to such changes in food habits as are needed in the future by examining the part which agriculture has played in the changes which have taken place in the past.

4. In the section which follows, an attempt is made to state, in general terms, the nature of the problem of agricultural adaptation, and in Section C an analysis is made of some of the obstacles to adaptation. The rôle of agriculture in improving nutrition is, however, positive as well as merely adaptive; accordingly, Section D is devoted to a summary of recent changes in agricultural methods—in order to bring out some of the major influences tending to increase and improve the supply of foods. Finally, in Section E an attempt is made to assess, in general terms, the effects on agriculture of the present movement towards better nutrition.

B. THE PROBLEM OF AGRICULTURAL ADAPTATION.

5. The increased production and the changes in its structure which constitute the counterpart of the shifts in food consumption traced in the preceding chapter originate in part on the side of supply and in part on the side of demand. In some cases, the initiative has come from the producers, who developed the output of certain foods, improved their quality and proceeded to create a market through advertising, price reductions, etc. In other cases, the initiative has come from the side of consumers: as a result of changes in taste or requirements, certain foods were increasingly demanded, their production became relatively profitable and agriculture adapted itself to this circumstance.

6. If accurate historical statistics of supplies and of prices were available, an attempt could be made to measure the relative influence of the demand and the supply factors in particular cases; but, as these are not generally available, it must be sufficient here to indicate the nature and complexity of the problem. One of the most striking examples of changes in consumption originating apparently on the side of increased and improved supplies is that of citrus fruits. Production of these fruits was greatly intensified and extended in the late nineteenth and early twentieth centuries, the producers carried out an active campaign to educate the public to the nutritive value of orange juice, etc.; demand was stimulated, and this led to a further development of production. In the preceding chapter, reference has also been made to the effect of increased supplies on prices and consumption of bananas. At the beginning of the present century, only Canary bananas were imported into the United Kingdom; they retailed at about 2*d.*, the supply was limited and they were sold only in the more expensive fruit-shops and not consumed at all by the masses. About 1901, with the development of production in the West Indies, large quantities of bananas were imported from that source. Demand, however, was lacking, as the populace had little experience of bananas and had not acquired a taste for them. In consequence, they were sold for a time at the unenumerative price of 2 for 1½*d.*, with the result that a general market was developed, taste for the fruit grew and demand rapidly increased. In Section D of this chapter, many examples are given of improvements in agricultural methods, which reduced the cost of producing food, improved their quality and brought about increased consumption.

7. Such examples make it clear that the changes in consumption habits traced in the preceding paragraph had their origin, in part, in changes in agricultural enterprise and methods. It would, therefore, not be legitimate to argue that the changes in production which formed the counterpart of the changing structure of food consumption represents exclusively the successful adaptation of agriculture to changed conditions of demand; and that policies designed to change food habits need not therefore concern themselves with the capacity of agriculture to make the necessary adaptation of production. Nor would it be legitimate to lose sight of the fact that the profound changes in conditions of food supply

and demand which occurred during the past decades involved certain agricultural systems in serious dislocation. Indeed, the increased competition of non-European agriculture imposed an extraordinary burden of adjustment and adaptation. In view of the difficulties in the way of adaptation (difficulties which are analysed in the next section of this chapter), it must be regarded as surprising that agricultural systems were able to adjust themselves as well as they have done; and that they have been able to reorientate production along lines which permitted the notable improvement in nutritional levels recorded in the previous chapter to be accomplished. This adjustment, however, was not without its costs and difficulties. Individual producers who were faced with increased competition or with a shrinking market for certain products, and who were unable for one reason or another to turn to other crops for which demand was expanding, were placed in a position of great difficulty and hardship. When demand declined or prices fell to unremunerative levels, the investment of capital and of long and arduous hours of labour failed to yield a return commensurate with that obtained in other occupations. The reorientation of production along new lines involved the loss of existing capital fixtures, the introduction of a new routine of cultivation, a break with the old methods. Even where capital was available to facilitate the process of adaptation, the adaptation itself not infrequently created new disequilibria. One example will suffice as an illustration. To meet the increased competition of overseas grain during the last quarter of the nineteenth century, mechanical methods were widely adopted in grain production in certain parts of Europe. The displacement of the horse by the machine during the early twentieth century led to a reduction in the demand for oats and other fodder crops and involved the producers of these crops in difficulties; many peasants, unable to sell their fodder crops, returned to more primitive methods of cultivation. On the other hand, there seems little doubt that the relative abundance of fodder crops resulting in part from this displacement was one of the factors stimulating animal husbandry and poultry-farming and so contributed indirectly to the increased consumption of the products of these branches of agriculture.

8. The brief considerations of the preceding paragraph are, perhaps, sufficient to make it clear that those whose task is to

safeguard the interests of agriculturists may reasonably ask that the effort of agricultural adjustment and adaptation which the present movement towards better nutrition involves should be clearly defined; and that, at the same time as steps are taken to raise nutritional levels, steps should also be taken to facilitate the adaptation of agriculture to the changes in the structure of demand which may result.

9. In attempting to define the effort of adaptation required of agriculture, particular stress must be laid on two points. The first is that nutrition policy does not involve a rapid transformation in the existing structure of national agricultural systems. The changes in demand which occur will of necessity be slow and gradual; the reorientation of production will be a long-run and not a revolutionary process. The second point is that, as nutrition policy moves towards its objective of an adequate diet for all, there will be an increase in the demand for all classes of agricultural products. Some groups of foods will, no doubt, benefit more than others; and it is likely that the demand for the protective foods will rise more rapidly than the demand for those consumed chiefly for their high energy value.

But, notwithstanding the considerable improvements effected in recent decades, the problem is not merely one of the qualitative composition of diets. For those fortunately placed whose general level of consumption is high, considerations of quality and composition of diet are, of course, of primary importance; and for these, improved nutrition means principally an increase in the consumption of protective foods. It is an unfortunate fact, however, that under-nourishment in the absolute sense still exists. Not only is it endemic in parts of Asia and Africa, where the general level of national income is low; it is found in Europe and America, and even in countries with the highest levels of income.

Clearly, the first aim of nutrition policy must be to ensure that all sections of the population have enough calories. It would be folly to allow the legitimate stress which is placed on malnutrition to obscure the existence of an equally real and perhaps even more pressing problem of under-nutrition. If man cannot live by bread alone, neither can he live by butter without bread. Energy requirements must first be met if full benefit is to be derived from the protective foods. Exact data on existing deficiencies in energy

requirements are not available, but there is no doubt that a considerable increase in the consumption of foods of high energy value—such as cereals, vegetable oils and, in certain countries, sugar—would be required in order to bring the calorie content of the diet of certain sections of the population of a very large number of countries up to standards of adequacy. For a long time to come, it appears likely that, taking the world as a whole, the increase in the demand for the energy-bearing foods among these population groups will—if nutrition policy achieves its objective—much more than counterbalance the fall in demand for them which accompanies the qualitative improvement in the diet of those who are already securing an adequate quota of calories.

10. Still other factors will tend to increase the demand for cereals in the future. One is the growth of population, which is still continuing in many countries. Not only does this growth involve an absolute increase in the energy requirements of the world as a whole, but it also tends to offset the relative reduction in the demand for the energy-bearing foods which will accompany an improvement in nutritional levels in countries where the level is already quite high. Moreover, sight should not be lost of the fact that increased consumption of the protective foods of animal origin will involve an increased use of cereals as animal feeding-stuffs.

11. It is clear, therefore, that nutrition policy by no means requires a drastic shift from the production of energy-bearing foods to the production of protective foods. Nor does it require that agriculture should produce protective foods in advance of the market—*i.e.*, before a demand at remunerative prices exists. What is required is rather that, as the movement towards better nutrition grows and spreads and as the demand for the protective foods in countries where the general plane of living is already high increases, national agricultural systems should gradually adapt themselves to the changing structure of demand and concentrate an increasing proportion of their productive resources on the protective foods. The best proof that agriculture is able to adapt itself to the expansion in demand for the protective foods lies in the fact that it is already doing so. The new tendencies in agricultural production in many countries are a clear illustration of this fact; in the paragraphs which follow, statistics are quoted to show the

extent to which certain national agricultural systems have been tending to increase their output of foods of high protective value.

12. A striking example is the increased attention which has been paid to dairy-farming in recent decades. In this field, Denmark provides the classic illustration of the adaptation of agriculture to a new situation. Formerly a cereal-exporting country, Denmark deliberately shifted the basis of her system to dairying and animal husbandry when the overseas competition in cereals rendered their production for export unprofitable in the eighties of the last century. The success with which this transformation was accomplished is so well known that it is unnecessary to quote details. It was facilitated by the high standard of education and spirit of co-operation among farmers, and its success was partly due to favourable natural conditions and to the close proximity of Hamburg and London, the main consuming markets. One aspect of the transformation is, however, worth stressing: far from this change in the structure of the Danish agricultural system resulting in a reduction in cereal cultivation, its effect was, on the contrary, to create a new demand for cereals (for animal feed) and so increase output. This is illustrated in Table I below:

Table I.

EVOLUTION OF DANISH AGRICULTURE.^a

	1870	1900	1934
A. <i>Dairying.</i>			
Number of dairy cows	808,000	1,075,000	1,716,000
Average milk yield per cow (kg.)	1,350	2,200	3,200
Total milk production (million kg.)	1,100	2,500	5,400
Butter exports (million kg.)	10	61	150

B. *Arable Farming; Harvest.*

(Yearly average in millions of crop units).

	1880-1884	1910-1914	1929-1933
Corn	23.6	29.1	41.8
Roots and potatoes	1.8	18.6	30.5
Grass	15.1	21.9	34.2
Total	40.5	69.6	106.5

^a Data taken from the Agricultural Council, Denmark — Agriculture (Copenhagen, 1935).

In 1933, 50% of the cultivated area of Denmark was under grain. The percentage is among the highest in Europe and compares with 45% in 1881. These figures make it clear that the encouragement of animal husbandry is by no means inconsistent with the desire to maintain a large proportion of land under cereals in order to be able to feed the domestic population in the event of a national emergency. Further reference is made to this important point in the following section.

13. If the example of Denmark is classic, it is by no means unique. Table II below shows that there has been a universal advance in milk production during the past decade.

Table II.

ESTIMATED MILK PRODUCTION PER ANNUM.^a

	Average production per annum of milk. (In millions of litres.)		
	1925-1929	1930-1934	1934 or 1933
Austria	2,010 ^b	2,480 ^c	2,540
Belgium	2,760	2,970	3,050
Denmark	4,300	5,200	5,000
Finland	2,210	2,310	2,450
France	13,370	14,320	15,230
Germany	19,240	23,160	23,300
Netherlands	3,800 ^d	4,410	4,690
Norway	1,230	1,320	1,360
Poland	8,500	9,050	9,020
Sweden	4,020	4,510	4,510
Switzerland	2,710	2,740	2,800
United Kingdom	6,140	6,700	7,140
Canada	6,410	6,980	7,200
United States	42,970	46,120	46,030
Australia	3,640	4,570	5,210
New Zealand	2,900	3,920	4,280

^a League of Nations: "The Problem of Nutrition", Vol. IV — "Statistics of Food Production, Consumption and Prices", documentation prepared by the International Institute of Agriculture (Geneva, 1936).

^b 1923 and 1927. ^c 1930 and 1934. ^d Rough estimate based on 1921-1930 daily herd.

14. The tendency for agricultural systems to pay increasing attention to dairy-farming is further reflected in the increase in the proportion of dairy cows in herds, which is shown in Table III below.

Table III.

PROPORTION OF DAIRY COWS IN HERDS.^a

	1913 %	1923 %	1933 %
Australia	18.0	17.3	24.3 ^b
Canada	41.2	39.6	42.3
Denmark	53.2 ^c	51.3 ^d	56.5
France	52.7	53.1	54.2
Germany ^e	53.9	56.2 ^d	56.8
United Kingdom . . .	38.7	44.1 ^d	42.2
United States	36.7 ^f	34.5 ^d	38.6

^a Based on data published in Imperial Economic Committee: "Cattle and Beef Survey" (London, 1934).

^b 1932. ^e Percentage of all cows to total cattle.

^c 1914. ^f 1909-1913.

^d 1924.

15. Another striking example of the newer tendencies in agricultural production to which attention may well be drawn is the growth of poultry-breeding. Table IV below shows the changes in the number of hens in certain European countries since 1913:

Table IV.

NUMBER OF HENS.^a

	(In millions.)			
	1913	1926	1930	1934
Austria	—	5.7	5.9	8.7
Belgium	12.1 ^b	—	18.2 ^c	—
Denmark	15.0 ^d	18.5	22.1 ^e	26.6 ^e
Germany	64.0 ^f	67.8	88.1	85.9
Great Britain and Northern Ireland	38.3	48.3	61.9	78.5
Irish Free State	14.2	16.5	18.2	16.0
Netherlands	9.8 ^b	15.0 ^g	24.6	34.5
Yugoslavia	—	13.7	16.3	17.9

^a Data furnished by International Institute of Agriculture.

^b 1910. ^c 1929. ^d 1914. ^e 1933. ^f 1912. ^g 1924.

16. The increase in the output of eggs was even greater than these figures suggest, as there has been a steady increase in the number of eggs per laying hen.

Table V.
PRODUCTION OF EGGS.²

(In millions.)

	1913	1926	1934
Belgium	960	2,354	2,070
Denmark	796 ^b	1,140	1,478 ^d
Germany	4,100	4,600 ^c	6,200
England and Wales	944	1,527	3,108
Scotland	177	215	414
Northern Ireland	—	412	536
Irish Free State	816	1,159	1,136
Switzerland	203	295	440 ^d
Yugoslavia	—	1,600	2,250

^a Data furnished by International Institute of Agriculture.

^b 1914. ^c 1927. ^d 1933.

17. In some ways, the most striking of the newer tendencies in agriculture is the recent development of horticultural production in all parts of the world. In all countries, the past decades have witnessed a remarkable expansion in the commercial production of fruit and vegetables. Thus, in Germany, the area under market gardens rose from 116,000 hectares in 1913 to 137,000 hectares in 1927 and 158,000 hectares in 1934. In England and Wales, the area devoted to vegetables rose from 74,540 hectares in 1925 to 92,550 in 1930/31¹—an increase of about 25%. In France, market-garden crops covered 325,000 hectares in 1927 and 371,000 hectares in 1934. In the Netherlands, the total area of family allotments and of market gardens producing for sale increased from 49,740 hectares in 1913 to 62,185 hectares in 1926 and 67,620 hectares in 1934. In the United States, the area under vegetable crops for sale doubled from 1919 to 1929, rising from 576,390 to 1,137,800 hectares.²

18. The extension of the area of cultivation of citrus fruits and the improvements effected in their quality have been mentioned above. Until about 1880, consumption was low and production was limited to Portugal, the Portuguese islands and the Mediterranean littoral. About the year mentioned, the United States and West

¹ *I.e.*, from about 185,000 to about 230,000 acres.

² *I.e.*, from about 1,450,000 to about 2,850,000 acres.

Indies became large producers, chiefly for American consumption; Mediterranean production continued to expand. During the past thirty years, production has been extended to the southern hemisphere; Brazil, the Argentine and South Africa have greatly extended the area under citrus fruit and have supplied the European market with the "summer orange", thus helping to reduce the seasonal fluctuation in the consumption of this important fruit. Production for domestic requirements has also been extended in South-Eastern China, Southern Japan and Australia. It is worth stressing the fact that the widening of the area under cultivation has not been at the expense of the traditional producers. On the contrary, exports of oranges from Spain rose from 817,000 dozen in 1886 to 2,600,000 in 1900 and 11,000,000 dozen in 1930; Italian exports of both oranges and lemons were twice as high in 1930 as in 1900. More recently, Palestine has greatly increased its importance as a producer; the area under oranges and lemons increased from an average of 5,340 hectares in 1925/26-1930/31 to 17,500 hectares in 1933/34, and exports of all citrus fruits rose from 2.7 million boxes in 1929/30 to 7.3 million boxes in 1934/35.

The adaptability of production is illustrated, not only in this expansion, but also in the change which occurred in the South of France in the latter part of the nineteenth century from the cultivation of oranges for fruit (which could no longer compete successfully with the increased imports from Spain) to the specialised cultivation of orange-blossoms and other blossoms for manufacture into perfume. During the past ten years, the increased consumption of fruit in France and the increased competition of synthetic perfumes have resulted in a marked tendency towards the growing of peach and apricot trees in this region.

19. In most countries of the temperate zone, the area under orchard and the production of fruit have been greatly increased in recent years. Moreover, important improvements have been effected in methods of production and marketing, and the quantity of commercially marketable fruit has risen more rapidly than the frequently imperfect data available for area under cultivation or total production suggest. The increase in the production of marketable fruit has made great headway in the United States, the Argentine and the British Dominions, but also in the United Kingdom and on the continent of Europe farm orchards are being

steadily displaced by commercial orchards planted with improved varieties.¹ The statistics available do not permit of an accurate summary of the extent of the recent changes, but the trend towards increased fruit production is very general. Thus, in England and Wales, the area under fruit was 275,000 acres in 1925 and 322,000 acres in 1935.² Not only has production been extended in Kent, the traditional garden of England, but new land has been brought under orchard in East Anglia and other parts of the southern half of England. In France, the production of fruit (excluding table grapes and production in private gardens) is estimated to have increased from less than 300,000 tons before 1927 to over 600,000 tons after 1933. In the Netherlands, the area under commercial fruit rose from 71,000 acres in 1925 to 87,000 in 1934,³ and the area under market gardens increased from 62,000 to 75,000 acres.⁴ In Norway, the number of fruit-trees is officially estimated to have increased by more than 10% between 1924 and 1934. In Roumania, the increase in recent years has been even more striking.

20. In certain countries of Central and South-Eastern Europe, the State has intervened to help and accelerate the process; and it is worth examining briefly the measures taken in one or two of these countries. In Bulgaria, for example, the difficulties encountered in selling cereals abroad led first to an increase of the production of tobacco for export; but, when tobacco prices fell during the recent depression, the peasants turned more and more to the production of other high-value products, principally vegetables and fruit. The initiative in this change in the structure of production lay with the producers and exporters; but since 1933 it has been encouraged by the authorities. Regulations have been issued for the control of the quality, state of preservation, freshness, packing, etc., of fruit and vegetables destined for export; and the success of these measures is witnessed in the figures for exports. Between 1929 and 1935, the quantity of fresh grapes exported rose from 2,100 tons to 34,000 tons; dried plums increased from 336 tons in 1927 to 9,900 tons in 1935; tomato exports rose from 195 tons in 1931 to

¹ See Imperial Economic Committee: "Fruit" (London, 1936).

² *I.e.*, from about 110,000 to about 130,000 hectares.

³ *I.e.*, from about 28,000 to about 35,000 hectares.

⁴ *I.e.*, from about 25,000 to about 30,000 hectares.

2,500 tons in 1935, apple exports increased from 219 tons in 1930 to 4,900 tons in 1935. The fact that this development took place in so short and unfavourable a period is a striking testimony to the capacity of agriculture to adapt itself to changed conditions of demand.

Hungary affords another interesting illustration of State assistance in fruit production. In 1929, a National Committee of Pomology was created at the Ministry of Agriculture to decide what types of fruit could be economically produced in the various parts of the country. The State established three public nurseries which distributed young trees, and regional orchards were established under State supervision in all parts of the country, where courses in fruit-tending were given to farmers and labourers. The Ministry of Agriculture, moreover, granted from 1933 to 1936 subventions and loans for the establishment of orchards to land-owners of 20 to 50 jochs; and fruit-packing courses were also held. An ordinance of 1934 grants tax exemption for a certain period to newly planted orchards. The number of fruit-trees in Hungary is estimated to have increased from 14.2 millions in 1929 to 15.3 millions in 1935; the increase was particularly notable for plum-trees, peach-trees and apple-trees.

21. The success of these various Government measures, designed to assist the adaptation of agriculture and improve agricultural methods, suggests that the reorientation of agricultural production towards an increase in the supply of protective foods might be further materially assisted by suitable State action. In particular, attention may be drawn to schemes adopted in some countries for recording the results obtained by farmers; the milk yield per cow, the efficient conversion of feeding-stuffs into pork or beef, egg yields, etc. The adoption of such schemes on a local or even parochial basis, especially where combined with competitions and substantial prizes, may stimulate the interest of individual farmers in the improvement of agricultural methods and help to accelerate and spread the application of improved methods, once they have been discovered.

C. OBSTACLES TO AGRICULTURAL ADAPTATION.

22. The problem of agricultural adaptation has been posted in the previous section. It has been argued that, if nutrition

policy moves forward on a broad front, there will result an increase in the demand for all classes of agricultural products—energy-bearing foods, protective foods and fodder crops alike. It has been suggested that, in countries where the general level of consumption is already relatively high, the success of the present nutrition endeavour is likely to entail a relatively greater increase in the demand for the protective foods than for the energy-bearing foods. The problem of agricultural adaptation in these countries may therefore be regarded as that of gradually reorientating production along the lines of a greater emphasis on the output of protective foods. On account of their perishable nature, many of these foods cannot enter into international trade, and a large increase in consumption is dependent upon domestic production. Statistics have been quoted to show that the current tendency in agricultural production in many countries is to pay increasing attention to dairying, poultry-breeding and horticultural production, and thus to increase the supplies of these highly nutritive products.

23. It is necessary to recognise, however, that there are obstacles in the way of the desired reorientation of agricultural production. The present section is therefore devoted to the enumeration of some of these obstacles and to a description of the efforts which have been made in the past to overcome them. Those obstacles to adaptation which have their origin rather in State policy than in natural conditions, however, are reserved for consideration in Chapter 4.

24. Perhaps the most serious lie in natural factors—soil and climate—and in technical organisation, which in some cases tends to limit the degree to which changes in production can be brought about. The importance of these factors in determining the character of the foods at present being produced differs greatly in the various parts of the world. Natural and technical factors are probably less important in Western Europe than in certain overseas countries. In the latter, vast areas of land are available; wheat is produced at relatively low cost through extensive methods, and cattle can (in the southern hemisphere) graze on open land throughout the greater part of the year, thus minimising the cost of handling, housing and feeding stock. The types of cultivation in these countries producing for export can be presumed to reflect

broadly the comparative efficiency and cheapness with which the different crops can be produced in the given natural conditions. These natural conditions limit the alternative opportunities. To take but one example, the possibility of turning from wheat to other crops in Western Canada is limited by the climate. The long cold winter, lasting for about seven months, necessitates the housing of live-stock; green pasture lasts for only a few months and may be destroyed by drought. But, even in Western Canada, there has been a tendency to produce more live-stock and more poultry and vegetables in recent years—a tendency which has been reinforced by the partial closing of foreign markets for wheat.

25. In most of Western Europe, natural conditions frequently play a less important part in determining the character of production, which is, indeed, sometimes ill adapted to the nature of the soil, the climate and the technical conditions of cultivation, such as the size of the farm. Here the obstacles to the adaptation of agriculture to the new consumption trends have been partly the special mentality of the peasant, partly the form of existing capital investment and partly the protection afforded to certain types of produce. Agriculture throughout a large part of Europe is less a form of economic enterprise than a way of life: in this respect, it differs radically from some overseas countries. Attachment to the soil and a tradition of cultivation is handed down from one generation to another; the peasant is frequently conservative in his outlook. Once the production of an individual farm is planned, it is difficult to change, and change may involve new capital expenditure and the partial loss of existing capital fixtures. Furthermore, individual producers may at times be unaware of general market trends and have no inducement to concentrate on one crop rather than on another. In this field, Governments have an important task to perform in informing producers of the trends in consumption and in facilitating the necessary changes in production.

26. Special importance must, moreover, be attached to the part which the Agricultural Co-operative Organisation can play (and has already played) in this connection. It would, indeed, be difficult to exaggerate the contribution of these organisations towards the adaptation and improvement of agriculture and consequently to improved nutrition. The shift in the basis of Danish

agriculture referred to in the preceding section would scarcely have been possible had it not been for the high spirit of co-operation among the farmers of that country. "Beginning with the care and feeding of stock, the upkeep of cattle-sheds, etc., the producers assume very strong obligations by adhering to the rules and regulations of the co-operative dairy to which they belong. But this is not enough. The incessant improvement of the best methods must rest on increasingly exact observations which call for special knowledge and sometimes costly apparatus. Further, such observations must be recorded and examined. All this constitutes a task for which producers were not long in recognising that they had neither time nor always the necessary qualifications. They therefore delegated it to 'inspection societies', the first of which was founded in 1895. To-day there are several hundred such societies, all created and financed on co-operative principles by the producers themselves. It is thanks to these societies that it has been possible gradually to eliminate diseased cattle, to select the breeds and animals with the highest yield, to improve feeding-stuffs, etc. In a general way, their activities, often closely combined with those of the stock-breeding co-operative societies, have been and still are decisive for all technical progress of dairy production."¹

Through scientific research and experiment, through improvement of animal and vegetable species, through improvements in methods of production, through training and education, through the encouragement of emulation and through disciplinary action and supervision, the agricultural co-operatives of many countries are doing much to orientate production along certain lines and to improve and guarantee the quality of the products placed on the market.²

27. The evidence goes to show, however, that farmers in general have adapted themselves not unready to changes in demand with considerable rapidity when these changes have expressed themselves in a modification of the relative prices of different types of agricultural products. When such price changes are checked by compensatory Governmental measures, the inducement to the farmer to alter his production is removed and nutritional

¹ See International Labour Office: "Workers' Nutrition and Social Policy" (Geneva, 1936), page 163.

² See International Labour Office: "The Co-operative Movement and Better Nutrition" (Geneva, 1937).

levels may suffer in consequence. This aspect of the problem of agricultural adaptation is dealt with in a later chapter, as it cannot be separated from the problem of relative prices. Certain other factors affecting the response of agriculture to changes in demand may, however, conveniently be considered first.

28. In Eastern Europe, where the nutrition problem is most important for the peasant population, a major obstacle in the way of improvement is the low level of output and, in certain countries, the high density of the agricultural population. The agrarian reforms which took place after the war divided up big estates into smaller units which were generally better adapted to intensive animal husbandry than to cereal cultivation. To some extent, there has been a favourable change in the character of production; but the lack of financial resources has prevented the movement towards animal husbandry from going very far. Where cereals continue to form the principal crop on the small estates, yield per man engaged in agriculture and yield per acre remain low, as the methods in use are frequently primitive. The suggestion is frequently made that the growth of industrialisation will raise nutritional levels in these Eastern-European States by reducing the number of people who draw their sustenance from the soil. The gradual improvement of methods of cultivation and the tendencies already in progress towards diversification of production will also serve this end.

29. Lack of capital resources must be counted among the most important hindrances to increased diversification of agriculture and increased agricultural efficiency. This is more especially true of the peasant States of Eastern Europe, where the rate of capital accumulation is low; but the statement applies as well to Western countries. A capital outlay is required to acquire live-stock, to house them and to buy fodder crops for them where cereals are not grown and green pasture is not available. Fruit-trees do not bear for two to six years, and resources must be tied up for this period. Efficient methods in arable farming generally involve the use of some machinery or machine-made implements and capital outlay for other purposes. In many countries, credits are not readily available for these purposes, or available only at rates which lay a very heavy burden on the borrower. In 1930, the

Sub-Committee on Agricultural Credit of the Commission of Enquiry for European Union expressed the view that:

“Lack of capital was one of the major factors which prevented the agriculturist from changing from those crops of which there was at present an excess to those the consumption of which was tending to increase. Moreover, all measures aimed at raising the standard of living in those European countries where the standard is at present relatively low must help to increase the demand for the higher-value agricultural products, such as meat, milk, fruit, etc. The granting of credit, and more especially the granting of credit where rates of interest are now abnormally high, would therefore help, on the one hand, to bring about those changes in production and, on the other, that increase in demand which are alike necessary for a general improvement in agricultural conditions. They would also certainly have the effect of increasing the purchasing power of agriculturists, and particularly their demand for industrial products.”

30. Up to the present, this analysis has been concerned with the obstacles in the way of the adaptation of production to the new consumption trends. These have been shown to be natural conditions, the conservatism of producers, commercial policy and penury of capital. Brief reference must now be made to another group of factors, connected with the marketing and distribution of foods, which have prevented the production and consumption of the protective foods from increasing more rapidly than it has done.

31. The quality of certain of the protective foods at present put on the market in some countries leaves much to be desired. Milk is the most important example, because, though it is one of the best foods available, it can also be the most dangerous. Quite apart from the varying nutritional value and chemical composition of milk (which depends upon the breed of cows, methods of feeding and methods of maintenance), there are the separate problems of its cleanliness and its safety. The question of quality is important also for eggs, fruit and vegetables. The consumer of eggs wants a guarantee of freshness; many countries have imposed standards of quality based upon an examination of egg contents by candling. The quality of fresh fruit and vegetables is more immediately apparent to the consumer. In recent years, the consumer has become more meticulous in his demands; attractiveness of appearance and uniformity of size and quality have become increasingly important.

Certain countries have imposed grading schemes, but, in others, fruit and vegetables of very different degrees of quality and attractiveness are placed indiscriminately on the market; and the uncertainty which results in the mind of the purchaser necessarily discourages the development of regular habits of consumption. It is clearly in the interests of producer and consumer alike that standards of quality should be laid down and that prices should bear some relation to these standards. Not only does this give the consumer a greater guarantee that he is getting merchandise of the quality he chooses to pay for, but it also provides a greater incentive to producers to improve the quality of their output. In this field also, an important contribution has been made by agricultural co-operative societies. Desirable as improvements in quality are, however, the tendency among distributors in some countries to lay too much emphasis on appearance and elaborate packing is one to be deprecated; it often renders nutritionally valuable fruit and vegetables unnecessarily expensive, and sometimes leads to the less attractive but wholesome products being eliminated altogether instead of being sold at reduced prices.

32. The perishable nature of many of the protective foods is a formidable obstacle to the rational organisation of the market, and must therefore be regarded as an obstacle to the reorientation of agricultural production. Many protective foods must be disposed of as soon as they are ripe, and the market is not always in a position to absorb the quantities coming forward at prices remunerative to the producer.¹ Prices to the producer fluctuate widely, not only in different seasons, but also in much shorter intervals, even at times in the course of a day; and there are frequently large differences between the prices which a commodity will fetch in different markets of the same country.² This adds an element of speculation to the production of fruit and vegetables, which has probably prevented the tendency towards this form of cultivation from going farther than it has gone.

33. In recent years, however, great advances have been made in refrigeration, cooling and storage; and it is to be expected that, as

¹ See paragraph 30 in Part II, Chapter 1, above, on fish marketing.

² United Kingdom Ministry of Agriculture and Fisheries: Economic Series No. 25 — "Vegetable Marketing in England and Wales" (London, 1935).

further progress is made along these lines and as the methods already known are brought into general use, the problem of the perishability will tend to become less important and its significance as an obstacle in the way of agricultural reorientation accordingly reduced.

It is only necessary to recall the part which refrigeration and chilling have played in regularising the supplies of meat to realise the possibilities. Until the invention of refrigeration by Carré in 1861, meat had either to be sold within a few days of slaughter, regardless of market conditions, or "cured". With the introduction of refrigeration, winter conditions were artificially created in packing-houses throughout the whole year and packing could be carried on without interruption. Refrigerated meat could be kept in the cool chamber for several weeks and marketed in good condition and orderly fashion. The subsequent application of the process to railway and ocean transport did away with distance as a factor in meat supplies.¹

Latterly, refrigeration has been successfully applied to horticultural produce in many countries. In the United States, for example, growers and distributors, in co-operation with railway and steamship companies, have developed facilities making possible the shipment of produce for great distances under controlled temperature and humidity conditions, and it is estimated that over two-thirds of all horticultural produce shipped by rail and by water are handled under these conditions. Extensive terminal cold-storage warehouses have been established at the larger and moderate-sized marketing centres; such warehouses have also been set up in the larger producing areas, where fruit and vegetables can be held under best conditions during the harvesting rush or stored pending the development of a favourable market.

The application of pre-cooling at the point of origin has reduced the amount of refrigeration required in transit. Preservation has also been achieved through freezing, and important research is now being carried out which seems destined, in time, to make freezing a standard technique in fruit and vegetable preservation. During the past few years, the freezing method of preserving peas has been used commercially in London.

¹ See United Kingdom, Ministry of Agriculture and Fisheries, Economic Series No. 6: "Report on the Trade in Refrigerated Beef, Mutton and Lamb" (London, 1925).

Refrigeration and cold storage have been used to an increasing extent in recent years in Western Europe. Striking progress has, for example, been made in Italy in the establishment of regional and local centres of pre-cooling; a large cold store was erected at Verona in 1931 and the State Railway system is well equipped to transport perishable goods in excellent preservation. In France, the necessary installations have to some extent been set up in Provence, the Rhone valley and Roussillon and railway refrigeration has been made available in these districts. In the Netherlands, two cold-storage houses with capacity of 500,000 kg. each have been established in the fruit-producing region of Betuwe; in Sweden, there are several large refrigeration plants near the principal fruit-growing districts, and in recent years many small pre-cooling stations have been set up by berry-growers. In Germany, a beginning has also been made: experiments carried out in 1931 showed that asparagus could be successfully stored for eight weeks, and the price realised at the end of the period was one-third higher than at the time of purchase. In Switzerland, interesting experiments have been carried out, *inter alia*, by the Station fédérale d'essais viticoles et arboricoles, at the cold-storage plant established at the Geneva railway terminus in 1932. In the Argentine, all fruit destined to be exported in refrigerated chambers has to be subjected to pre-cooling for anything up to twenty-four hours before loading. In general, the use of cold preservation of fruits and vegetables is at its beginning in Western Europe, the United States and South America, and is scarcely known in Central and Eastern Europe.

34. Substantial advances have also been made in canning methods in recent years and the industry shows a remarkable growth throughout the world. The canning and drying of fruit and vegetables, the manufacture of jam and fruit-juice, the brining and pickling of vegetables are all worthy of mention as technique tending—along with refrigeration and cold storage—to reduce the commercial hazard in producing perishable foods and to afford consumers a more uniform supply at more reasonable prices.

35. The importance of adequate and economical transport facilities for fruit and vegetables has been referred to above. In the opinion of many, the great expansion of fruit and early vegetable culture in France during the past half-century is largely due to

the railways. Schedules are fixed with the needs of producers and the market in view; thousands of specially ventilated express wagons have been constructed; end-of-season rates are given on certain vegetables consigned to the Paris market; at least one company has set up an agricultural research department to disseminate scientific knowledge and has distributed plants and seeds free of charge. In certain European States, on the other hand, no special facilities whatever exist for the transport of perishable goods; ordinary goods vans are used and quality and appearance are frequently seriously impaired by the time the commodities reach their destination.

36. The question of transportation charges is obviously important; in some countries, these appear to be very high in relation to the product's value and to limit the development of consumption.

37. Of still greater importance is the whole question of the organisation of distribution and marketing. A wide range of problems enters into consideration in this connection, and it is not possible at this point to do more than briefly indicate some of the more important. Reference has already been made to the desirability of improved methods of grading; in addition to the advantages already mentioned, the easy identification of produce on the basis of grades would be of great assistance to the wholesale and retail trader and would eliminate waste arising from the purchase of unsaleable goods which prejudice the consumer and for which, ultimately, he must pay. Methods of packing must also be mentioned in this connection. In many countries, a large proportion of fruit and vegetables is marketed loose. They are handled several times before they reach the consumer, and each handling increases the risk of deterioration both of quality and of appearance. When containers are used, they are frequently overloaded and sometimes include low-grade material which cannot be sold but adds to the cost of transport.

38. The organisation of the wholesale and retail trade varies widely in different countries and it is difficult to make any generalisations in this field. The complaint is frequently heard that the number of middlemen handling food products is excessive, that retailers' margins are high and that the wide spread which frequently exists between the price the producer gets and the price

the consumer must pay is a factor of major importance in restricting consumption.

39. In the present sections have been enumerated some of the more important obstacles to the adaptation of agriculture to the new consumption trends. Attention has particularly been directed to the importance of natural conditions, lack of capital, tradition, low level of agricultural technique and the perishability of certain of the protective foods; and an account has been given of some of the attempts being made to overcome certain of these obstacles and so assist agriculture in its task of adaptation. One particularly important obstacle—namely, Government policy—has been reserved for separate treatment in a later chapter.¹

D. RECENT CHANGES IN AGRICULTURAL METHODS.

40. The general conclusion to which the preceding sections points is clear. By and large, agriculture shows an inherent capacity to meet new requirements as they develop. Obstacles, both natural and artificial, do no doubt exist; but the analysis of their nature suggests that, given wise and sympathetic consideration, many of these obstacles can be overcome. There need, therefore, be no serious misgivings regarding the capacity of agriculture to adapt itself to the changes in consumption habits which will result from an acceleration of the movement towards better nutrition.

41. This statement, however, minimises the part which agriculture has played in the considerable improvement in nutritional standards which has already taken place; and it gives not even an approximate idea of the capacity of agriculture to contribute to the improvement in food-consumption habits which may be expected in the future. For the contribution of agriculture and agricultural science has been positive as well as merely adaptive. Through the application of new methods to the production of foods, yields have been increased, qualities have been improved, new varieties have been invented. If the economic problems with which the world is faced to-day are to some extent problems of abundance rather than of scarcity, it is thanks in part to the inventive genius

¹ See Chapter 4 below.

of those who have concerned themselves with agricultural methods and to the enterprising spirit of those who have applied them. The application of science to agriculture has produced a technical revolution parallel to, though less spectacular than, the industrial revolution.

42. Recent technical changes have been mainly of two kinds: the use of mechanical processes instead of hand labour, and the application of biology and chemistry to agriculture. Mechanical processes have, up to the present, been most conspicuously successful in connection with grain production. For tilling and ploughing, the mechanical tractor is in common use in the United States and Canada. The number of tractors in use in the United States rose from 246,000 to 920,000 between 1920 and 1930; at the same time, the number of horses fell from 17.2 to 12.9 millions. Until the invention of the reaper and binder, one man could cut grain by scythe at the rate of about an acre a day, or by horse-drawn reaper at the rate of less than 10 acres a day. The reaper and binder reduced the costs of cereal harvesting greatly; it came into general use in the United States in the 1880's. In the 1890's, the combine harvester began to be used in that country, and by the outbreak of the war its use was general. With the aid of this machine, two men can harvest 50 acres of wheat per day. The combine harvester is most adapted to countries where grain is grown on large holdings and where the standing crop is ripe and completely dry at harvest time. At present it is most commonly used in the United States, the Argentine, Australia and parts of Canada and the Union of Soviet Socialist Republics. In 1918, fourteen combine harvesters were at work in Kansas; by 1929, the number had risen to 25,000. The use of these mechanical methods is most common in the countries of extensive grain cultivation. The following table shows the total mechanical and animal power estimated to be available to agriculture in the United States, for example:

Table VI.

TOTAL AND MECHANICAL HORSE-POWER IN THE UNITED STATES.

Year	Total horse-power (000,000's)	Horse-power contributed by mechanical power (000,000's)
1910	27.9	6.8
1920	37.5	16.2
1930	70.5	53.3

But the trend towards mechanisation of agriculture is evident elsewhere; it is of course partly responsible for the general decline in agricultural populations referred to in the preceding chapter. Thus, in the United Kingdom, the number of horses used for agricultural purposes fell from 807,000 in 1913 to 386,000 in 1935; 6,400 tractors were sold in 1935, compared with 3,800 in 1931. Where labour is abundant and the farm unit small, manual processes continue to predominate. Thus, according to figures published by the Roumanian Ministry of Agriculture,¹ 36.6% of the peasant properties of that country are entirely without animal traction, to say nothing of mechanical traction. The countries where mechanisation has gone farthest are those in which agricultural labour is (or has in the past been) scarce in relation to land.

43. The use of mechanical processes has been most striking in tilling, ploughing and the harvesting of grain, but most branches of agriculture have been affected. Thus, haymaking devices, milking machines, beet-lifters, fruit and egg graders and planting machines are becoming more and more widely used.

44. The application of the biological and chemical sciences to agriculture has given even more far-reaching results than the application of mechanical processes. A classic example is the breeding of Marquis wheat in Canada just before the war. This grain ripens up to ten days earlier than those previously in use, and it has enabled the frontier of wheat cultivation to be pushed 100 miles north and is estimated to have added 100 million acres to the potential wheat-belt of Canada alone. Through further crossing and selection, still earlier maturing varieties, notably Garnet wheat, have been developed in recent years. In other countries, notably Australia, the United States and the Union of Soviet Socialist Republics, similar results have been obtained, particularly in the development of drought-resistant breeds of wheat. The effect of these developments has been enormously to increase the world's potential wheat reserves.

45. Another striking example of plant breeding is the crossing of a wild cane with a cultivated variety in Java; the resulting hybrid (the famous P.O.J. No. 2878) had a yield 15 to 20% higher

¹ Quoted in *Epica*, February 19th, 1937.

than any variety previously known. The use of this cane has, with careful husbandry, increased the yield of sugar on the island to as high as 6 tons per acre, as compared with an average of 16 cwt. per acre in 1840-1843. Striking progress has also been made in the technique of sugar-beet cultivation.

46. Examples of the work of the plant-breeder could be multiplied almost at will. Not only in rye, maize and rice, but also in fruit and vegetables, varieties have been produced which have greatly increased yields or improved quality with little or no additional cost. In the Union of Soviet Socialist Republics, for example, varieties of fruit have been developed which grow to maturity in cold northern climates. In the United States, experiments have been conducted in the breeding of citrus fruits with a view to selecting strains with the richest vitamin contents. Especially noteworthy from the point of view of the potential supply of the protective foods of animal origin is the selection and crossing of grasses, clovers, lucernes and other fodder crops. Elsewhere, pasture plants have been produced with two or three times the feeding value of natural pastures. Through the cultivation of varieties which grow early in the spring and late in the autumn, the grazing season has been extended. Moreover, in recent years, important progress has been made in drying young grass for winter feeding. The process of haymaking has been long known to be wasteful of feeding value, including vitamins and minerals; an official enquiry has estimated the loss in nutritive value involved in making grass into hay at £5 million annually for Great Britain. The same enquiry estimates that, in order to obtain the nutritive value of a ton of dried grass by buying other feeding-stuffs, it would be necessary to pay £7 10s., while the cost of producing a ton of fresh grass is estimated at about £2. It is obvious that there is a considerable margin to pay for the cost of drying, and in future the use of this process may become important. In Denmark, strains of mangolds have been bred with extremely high solid-matter content and nutritive value, and the bad strains, consisting largely of water, have been forced out of cultivation. A great advantage of scientific advances in connection with grass and other fodder crops is that they enable the output of the protective foods to be increased without recourse to new land.

47. One aspect of the work of the plant-breeder the importance of which can scarcely be exaggerated is that the principal cost which it involves is the original non-recurring one of research. Once the desired strain has been developed, the seeds are scarce and relatively costly only for a few crop seasons; when the new seed gains general acceptance and use, it costs no more than the older, less productive strains. No capital outlay is therefore involved in the utilisation of scientific discoveries in this field.

48. In the field of animal husbandry, breeding and feeding have greatly increased food output per animal. As a result of research and experimental work in animal nutrition, precise standards are now available for live-stock feeding. The application of up-to-date methods has given remarkable results wherever it has been attempted. Table I above shows, for example, that in Denmark the average annual milk yield per cow rose from 1,350 litres in 1870 to 2,200 litres in 1900 and 3,200 litres in 1934; at the same time, the butter-fat content also increased. In England and Wales, the average yield of cows recorded by the milk-recording societies increased from 599 gallons in 1918/19 to 700 gallons in 1932/33.¹ In New Zealand, the average production of butter-fat per cow, which had increased by about 25 lb. between 1901 and 1920, increased by 69 lb. between 1920 and 1934. In Estonia, average annual output per cow rose from 2,015 litres in 1923/24 to an average of 2,500 litres in 1933, and in Finland the increase was even greater. So far as meat production is concerned, the progress of the past century can be summarised in the statement that the carcass dressed weight of a two-year-old animal to-day is equivalent to that of a five-year-old beast a hundred years ago. Great progress has also been made in poultry-breeding; it is estimated that between 1913 and 1934 the average annual output per hen rose from 80 to 90 eggs in Germany, from 80 to 115 in Belgium, from 75 to 120 in England and Wales and from 100 to 124 in the Irish Free State.

49. Reference should perhaps also be made to the work of the chemist and bacteriologist in maintaining and increasing soil fertility, to the work of the entomologist in combating plant disease,

¹ *I.e.*, from about 2,725 to about 3,200 litres.

and to the work of the geneticist in improving breeds and of the veterinary surgeon in reducing animal disease. But the examples already given are sufficient to indicate the extent to which agriculture and agricultural science have contributed to the improvement in nutritional standards.

50. Steady progress is being made in the dissemination and application of scientific information. The International Institute of Agriculture is charged with an important task in arranging for the international exchange of scientific research. Governments and educational institutions in all countries are paying increasing attention to the necessity for acquainting the individual farmer with the results of scientific research. Useful work in this field is performed by national organisations such as the Imperial Agricultural Bureaux of the British Commonwealth, and by various technical journals engaged in the constant review of scientific literature affecting agriculture. The agricultural co-operative movement in certain countries is also making an important contribution along the same lines. But in many countries the machinery of education is inadequate, and important results could be achieved through the expenditure of relatively small sums of money in encouraging the adoption of proved methods and processes. Even if, during the next five years, no further new discoveries were made, but intensive national efforts were concentrated on securing the application of existing knowledge, the results on agricultural prosperity and nutritional standards would be enormous.

E. EFFECT OF IMPROVED NUTRITION ON AGRICULTURE.

51. World agriculture and national agricultural systems cannot fail to gain from the acceleration of the movement towards better nutrition. The improvement in the quantity and quality of diets which nutrition policy aims to accomplish involves an increase in the demand for all classes of agricultural products. There is everywhere among consumers a latent demand for additional food to ensure optimum health; and everywhere among producers the capacity to supply these additional needs exists. It is not possible to estimate accurately how the demand for each individual food will be affected. In some countries, where the level of national income is low, improvement in diet will take the form principally of

increased consumption of foods of high energy value. In others, where average income is high, the stress will be more particularly on the protective foods.

But, even in these countries, recent studies of consumption suggest that appreciable sections of the population are not at present consuming enough of the energy-bearing foods, and that there is a latent demand for them as well as for the protective foods. Moreover, in countries where the stress is placed on the qualitative composition of diets, this generally involves an increase in the consumption of foods of animal origin; this, in turn, implies an increased demand for cereals and other products of arable farming for use as feeding-stuffs. It is therefore clear that all branches of agriculture will benefit from the steps which are taken to bring national diets closer to the norms laid down by modern physiology.

52. The information at present available regarding national food-consumption habits is not sufficient to form the basis of an accurate judgment of the extent to which consumption falls short of standards of adequacy. Estimates have, however, recently been made which illustrate how profound would be the beneficial effects on agriculture if all sections of the population of two countries where the general level of consumption is already high were adequately fed. For the United Kingdom, it has been calculated¹ that, if the food consumption of the whole population were raised to the level of the top 10%, this would involve an increase in the demand for milk of 80%; for butter, of 41%; for eggs, of 55%; for meat, of 29%; and increased expenditures on fruit and vegetables of 124 and 87% respectively. For the United States, it has been estimated² by the Bureau of Agricultural Economics that the land (exclusive of grazing-lands) required to produce diets of specified nutritive contents ranges from 1.2 acres per head per year for a "restricted diet for emergency use" to 2.1 acres for a "liberal diet".³ The latter figure is 10% higher than the average acreage used to produce the type of food apparently consumed during 1927-1931. It is obvious that the figures quoted in this paragraph

¹ J. B. ORR: "Food, Health and Income" (London, 1936).

² See U.S. Dept. of Agriculture, Circular No. 296: "Diets at Four Levels of Nutritive Content and Cost", by Hazel K. STIEBELING and Medora M. WARD (Washington, 1933).

³ For the content of these diets, see Chapter 5, paragraph 14, below.

must be treated with reserve; none the less, they illustrate the extension of agricultural activity which would result from the success of nutrition policy.

53. As the movement towards better nutrition spreads and grows, certain adjustments will be called for in national agricultural systems. Diversification of diet involves diversification of agricultural production. As the highly protective foods (dairy products, fruit and vegetables) tend to constitute a larger proportion of the national diet, in countries where the general level of consumption is already relatively high, there will be a tendency to shift from the production of the staples to the production of these foods. Many of them, such as liquid milk and some fruits and vegetables, cannot, owing to their nature, enter largely into international trade; and all national agricultural systems are consequently likely to be directly affected by the changing structure of domestic demand.

The commodities with an upward trend of consumption are, characteristically, high-value goods. Per unit of land used or per unit of capital invested, they bring a higher return to the producer than the foods of high energy value. This is particularly the case wherever the greater part of the agricultural land is held in small holdings ill adapted to mechanised low-cost methods used in the production of cereals on the extensive holdings of the non-European countries. These small holdings are, on the other hand, very well adapted to animal husbandry and the more intensive cultivation of fruit and vegetables. Soil fertility is, moreover, increased through the farmland manure which forms an important by-product of animal husbandry.

54. The diversification of production which would result, and has already resulted, from national agricultural systems adapting themselves to the new consumption trends not only involves a concentration on higher-value crops: equally important is the fact that it involves the spreading of risks and consequently an increased guarantee of agricultural stability. A very striking feature of recent years has been the persistence with which the demand for fruit and vegetables in most countries increased, even in the years of deepest depression. The strength of the underlying trend of the new food habits could not be more

convincingly demonstrated. The price of no product is immune from the general downward sweep which occurs during a period of economic depression; but it is obvious that commodities for which the underlying trend of demand is upwards are in a less exposed position than others. During the recent economic depression, the prices which the producers of many countries received for liquid milk for human consumption, for fruit and for fresh vegetables fell both later and less than the prices of the staple foodstuffs. To quote only one example, the following table shows the annual movements of the prices received by farmers in the United States for various types of farm products along with the general index of farm prices :

Table VII.

INDICES OF PRICES RECEIVED BY FARMERS IN THE UNITED STATES.

	(1929 = 100).			
	General index	Fruits	Commercial truck crops *	Dairy products
1930	86	115	94	87
1931	60	70	79	69
1932	45	58	68	53
1933	48	52	70	53

* *I.e.*, market vegetables.

These figures suggest that diversification not only tends to raise agricultural income, but also increases the likelihood of its being maintained during cyclical fluctuations.

55. Moreover, the nutrition of the producer himself is directly improved through this diversification. In the technical conditions of cultivation prevailing in a large part of Europe, a diversification of agriculture is likely to result largely from individual farms increasing the variety of their output, and the increase in the variety of crops produced will make possible an increase in the variety of the diet of the farmer and his household. It would be difficult to exaggerate the necessity for this development.

Elsewhere in this report, statistics are given to show the low level of nutrition prevailing among those engaged in agriculture in several parts of the world. The data available are unfortunately fragmentary and it is to be hoped that they will be improved in the near future; the Health Organisation of the League is taking steps, in conjunction with national administrations, to enquire into

rural nutrition in several countries. Enough is, however, already known to make it clear that—paradoxical though this seems—the deficiencies in the diet of the millions of persons engaged in primary food production are by no means less important than of those engaged in industrial occupations. The disproportion between the prices which the small peasant receives for the crops he puts on the market and the prices he must pay for his modest purchases of industrial goods is frequently so great that, when he concentrates his productive resources on one or two crops, he is unable to supplement his monotonous and one-sided diet by purchasing other food. Any steps which are taken to increase the number of crops produced on such small farms cannot but have a beneficent effect on the producers' nutritional status. In some cases, natural conditions limit the variety of crops which can be produced, but in others conditions are favourable to the production of foods which are notoriously deficient in rural diets. Through education and instruction, much could be done to improve the diet of rural populations in this way.

56. Agriculture may expect to derive still other benefits from the movement towards better nutrition. In most Western-European States, rural depopulation is viewed with considerable misgiving and there is a widespread desire to stop the efflux of young people from the country to the towns. The economical production of dairy produce and of fruit and vegetables requires more labour per unit of land than does the economical production of cereals. Most grains, once sown, require but little attention until harvesting. In dairy-farming, on the other hand, labour is constantly employed in feeding, milking, etc. Vegetables also require much attention. Mixed farming is thus admirably adapted to the family structure of the farm so common in many parts of the world, and a policy of encouraging and facilitating the transition to this form of agriculture, where it is technically possible, would serve the additional purpose of making it possible for larger numbers of people to draw sustenance and profit from agricultural pursuits.

57. Such a policy of facilitating the adaptation of European agricultural systems to the new consumption trends may well bring advantages also to the countries which, through their natural or technical conditions, are best adapted to produce the great staple

foodstuffs. A greater concentration of national agriculture on supplying the increased domestic requirements of liquid milk, fruit, vegetables, eggs, etc., which would result from an improvement in nutritional standards may lead to an expansion of international and intercontinental trade in cereals, sugar, chilled and frozen meat, and butter, with mutual profit to the producing and the consuming countries.

58. The objection is sometimes raised that a deliberate policy of diversification of farming might result in increased dependence on foreign supplies of essential foodstuffs in case of national emergency, and that therefore encouragement should be confined to the production of the high-energy foods, such as the cereals and sugar-beet. It is undoubtedly true that, per unit of land, a larger number of calories for human purposes can, in normal circumstances, be derived from sugar-beet and cereals than from the highly protective foods. Certain considerations, however, weigh on the other side. In particular, it must be observed that dairy-farming and cereal production are not necessarily mutually exclusive alternatives. The method of feeding the animals is the determinant factor. Under the method of "arable animal husbandry" in use in Denmark, the animals are partly fed with cereals which each individual farmer grows himself. It has been shown in Table I above that the change from cereal exporting to specialised dairy production in Denmark involved no reduction in the total production of cereals. Domestic cultivation was indeed intensified, though the type of cereals and the purpose for which they were produced changed. The natural and technical conditions of cultivation (*e.g.*, the amount of rainfall in relation to evaporation, the size of holdings) suggest that "arable animal husbandry" can be much more widely extended to other European countries.

* * *

59. The present chapter has covered a wide field in general terms. It has been argued that agriculture shows an inherent capacity to adapt itself to the changes in the structure of demand, but that certain factors tend to impede such adaptation. The most important influence, other than climate and soil, determining agricultural production—namely, Government measures designed to influence

the prices obtained by the produce—has been left for consideration in the next chapter. It has also been argued that not only world agriculture as a whole, but also the various national agricultural systems, will benefit greatly from an extension of the movement towards better nutrition. The effect of the factors hitherto analysed in general terms on nutritional levels remains to be discussed in detail. The increased food consumption which it is the object of nutrition policy to encourage depends ultimately (measures of social assistance apart) upon the real purchasing power of the consumer and upon his knowledge of the nutritive value of the protective foods and willingness to apply this knowledge. Real purchasing power is a function of prices on the one hand and income on the other. The next chapter is devoted to a consideration of the relationship between prices and consumption, and Chapter 4 to an analysis of the influence on prices both of commercial and fiscal policy and of the natural long-run factors affecting production and distribution. In Chapter 5, an analysis is made of the rôle of income in determining nutritional levels, and the influence of education is analysed in Chapter 6.

Chapter 3.

FOOD PRICES AND CONSUMPTION.

1. The purpose of nutrition policy is to direct consumption, both quantitatively and qualitatively, along the lines which the new science of nutrition has indicated as being conducive to health and efficiency. A necessary prerequisite for such policy is a knowledge of the factors mainly responsible in determining consumption levels and the state of nutrition. Among these factors, it is clear that food prices, incomes and the level of nutritional knowledge play a dominant rôle. The influence of incomes and nutritional knowledge is reserved for separate treatment in Chapters 5 and 6. The present chapter is devoted to an examination of the rôle of food prices in determining consumption levels, while the following chapter indicates some of the main factors influencing food prices on the supply side.

2. The general theoretical relation of prices to consumption is familiar in the form of the "law of demand". A change in the price of any commodity tends to set up two kinds of demand reactions. In the first place, it affects the real income of consumers—raising purchasing power if the price falls, or reducing purchasing power if the price rises. The purchasing power thus gained or lost may lead to an increase or decrease in the consumption, not only of the article whose price has changed, but also of any other articles according to the consumers' scales of desires. In the second place, a change in the price of one commodity alters its cheapness or dearness relatively to other commodities prices of which have not changed, or not changed to the same extent. This second influence is particularly important in the case of commodities for which efficient substitutes are readily available.

3. Price elasticity¹ of demand consists, therefore, of two components: income elasticity—*i.e.*, changes in demand resulting from

¹ *I.e.*, the ratio of proportionate change in demand to proportionate change in price.

changes in income—and elasticity of substitution—*i.e.*, changes in demand resulting from changes in relative prices. Chapter 5 furnishes data regarding the first element. The analysis made in that chapter shows that, in general, the income elasticity of demand is greater for protective foods than for those supplying mainly energy; or, in other words, that consumers, as their incomes rise, tend to increase consumption of protective rather than of non-protective foods. This fact would suggest that the price elasticity of demand for the protective foods is, on the whole, probably greater than for the non-protective foods, except in so far as the elasticities are modified by possibilities of substitution. If, for instance, prices of non-protective foods as a whole fall (relatively, of course, to incomes and other prices), it is not to be expected that their consumption will increase very rapidly, but rather that the purchasing power released will be spent mainly on the protective foods which have a higher elasticity of demand. On the other hand, if the price of only one non-protective food—say, of one cereal—falls in a country where more than one cereal is in common use, a considerable increase in its demand may arise from the substitution of this cereal for the others whose prices have not fallen; in addition, there may be an increase in the demand for protective foods due to the purchasing power set free.

4. The above considerations regarding price elasticities of demand are deduced indirectly from information concerning income elasticities. It is also possible, however, to assess directly the importance of prices in guiding consumption by concrete calculations of price elasticities of demand—*i.e.*, the proportionate change in amounts purchased which, on the average, correspond to given proportionate changes in price. Such calculations of demand elasticities are clearly of central importance for nutrition policy, in particular as regards agriculture. Information in this field is at present very restricted, mainly owing to the inadequacy of consumption statistics, to which attention has already been drawn.

5. A very rough illustration of the relation between retail prices and *per caput* consumption of butter, milk and eggs in a few countries during the ten years 1925-1934 is given in Diagram I. ¹

¹ Based on League of Nations: "The Problem of Nutrition", Vol. IV. — "Statistics of Food Production, Consumption and Prices", documentation prepared by the International Institute of Agriculture (Geneva, 1936).

Diagram I.

PRICES AND CONSUMPTION OF BUTTER, EGGS AND MILK.

(1925 = 100.)

A Real price.

B Consumption.

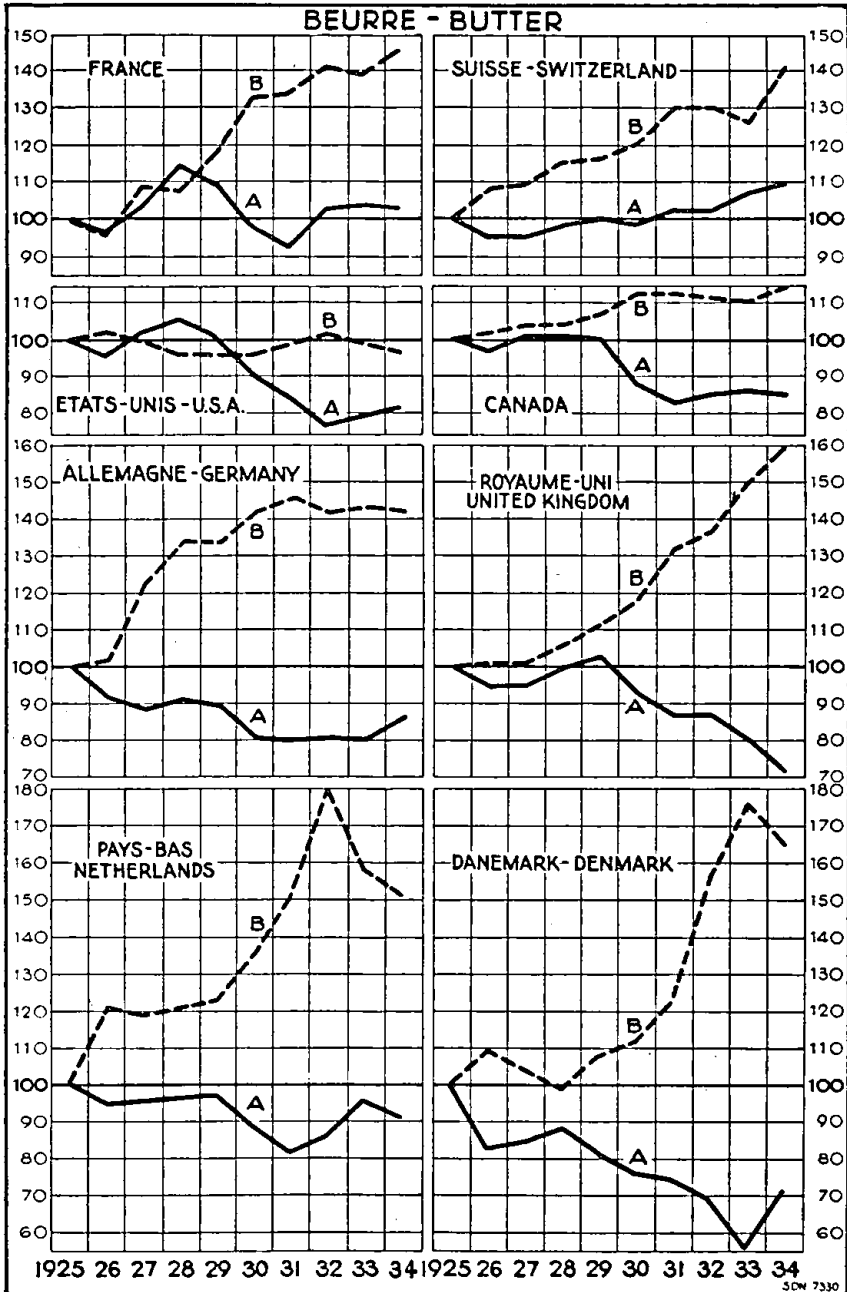


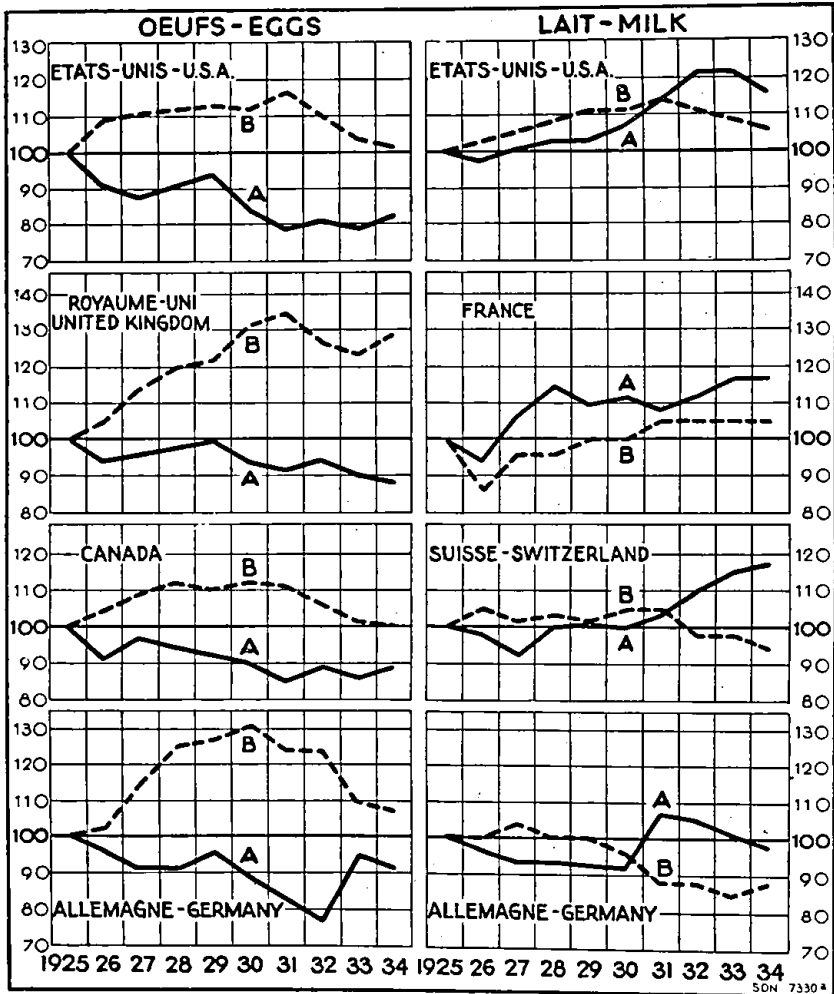
Diagram I (continued).

PRICES AND CONSUMPTION OF BUTTER, EGGS AND MILK.

(1925 = 100.)

A Real price.

B Consumption.



Influences on consumption other than price are disregarded, and the retail price of each commodity has been deflated by an index of all retail food prices. The price curve, that is to say, does not show the changes in the actual retail prices of the commodities in question, but in the relationship between their prices and the prices of all foods; in short, it shows the changes in the "relative"

and not the "absolute" dearness of the foods covered. In spite of over-simplification and of the roughness of the national consumption estimates, a fairly clear negative price elasticity—an inverse relation between prices and consumption—can be seen in most cases. The elasticity appears, on the whole, to be greater, and the correlation better, in the case of butter than in that of milk and eggs, probably owing to the greater possibilities of substitution in the former case. It may be noted that elasticity of demand for butter tends to be less in countries, such as Canada, where the *per caput* consumption is already high and where the main substitute, margarine, is not available.

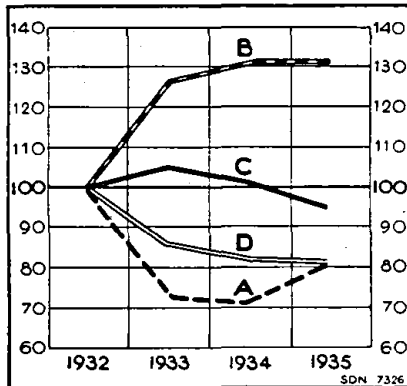
A clear relation between prices and consumption of oranges and bananas in Sweden is shown in Diagram II below.¹

Diagram II.

PRICES AND CONSUMPTION OF ORANGES AND BANANAS
IN SWEDEN.

(1932 = 100.)

- A Consumption of bananas.
- B Consumption of oranges.
- C Price of bananas } deflated by total
- D Price of oranges } food cost index.



Similarly, the effect of prices on the consumption of milk, beef, pork, sausages and sugar by families of workers in Vienna can be seen distinctly in Diagram III. The consumption data have been obtained from family consumption studies of the Chamber of

¹ Data taken from *Statistik Årsbok*, 1936. Net imports were used for consumption.

Labour and relate to twenty-two identical families which kept records continuously from 1927 to 1934; the prices are those actually paid on the average as ascertained by dividing the expenditure incurred by quantities purchased, and they have been deflated by the cost-of-living index for Vienna.¹

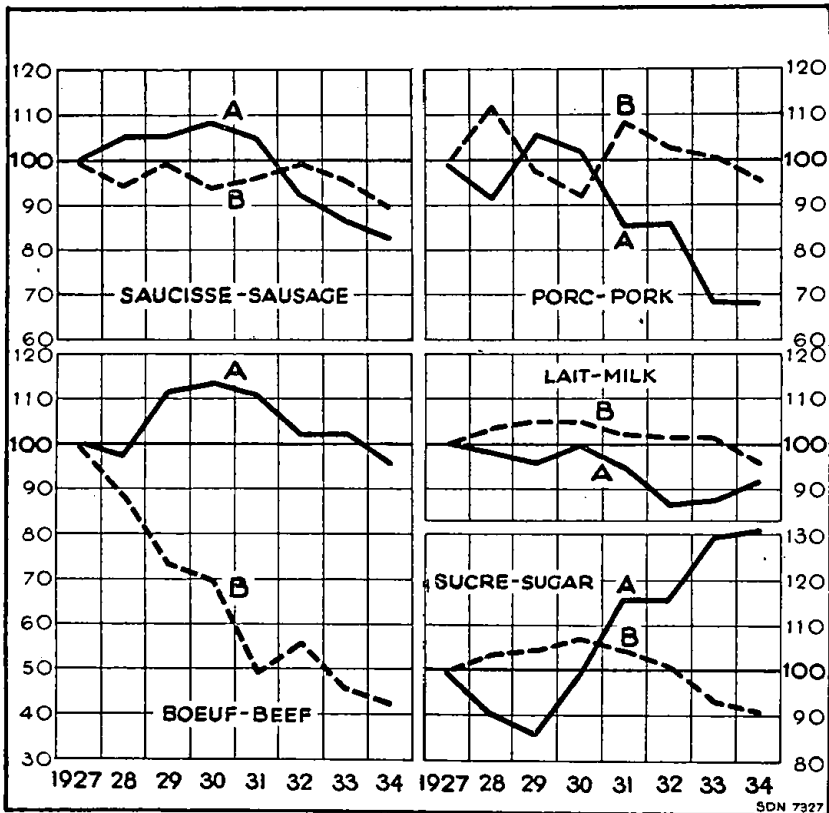
Diagram III.

PRICES AND CONSUMPTION: WORKERS' FAMILIES IN VIENNA (1927-1934).

(1927 = 100.)

A Real price.

B Consumption.



6. Another rough indication regarding price elasticities can be obtained from observations in local communities of prices and sales of large, well-established retail stores, which serve a substantial

¹ "Kammer für Arbeiter und Angestellte in Wien", *Wirtschaftsstatistisches Jahrbuch*, 1936, Table 169.

proportion of the demand of a district. The following examples supplied by local consumers' co-operative stores in Austria provide some interesting evidence on the relation of retail prices to sales of a few foodstuffs.

Table I.
PRICES AND SALES IN CO-OPERATIVE STORES (AUSTRIA).
Consumers' Co-operative in Lower Austria.

	1934		1935	
	Prices Schillings	Sales Kg.	Prices Schillings	Sales Kg.
Apples	0.34	68,700	0.55	45,500
Beans (Wachtelbohnen) . .	0.53	6,200	0.48	9,400
Apple jam	1.80	720	1.60	1,360
Flour	0.72	355,600	0.74	332,300

Consumers' Co-operative in Carinthia.

Lard	2.53	62,048	2.60	59,643
Vegetable fat and dripping	1.84-2.00	7,995	1.79-1.87	16,459
Salad oil	1.35	80,649	1.34	86,652
Maize	0.36	314,323	0.38	292,825

7. A number of investigations concerning the elasticity of demand for certain foodstuffs have been made with more refined statistical tools. Table II¹ gives a summary of the results of a few such investigations. When an elasticity is shown as 1, it means that it has been found that a reduction of, say, 10% in price led, on the average, to an increase of about 11% in demand, such that the total value of sales remained always constant; and similarly in the case of an increase in price. When an elasticity is greater than 1, it means that the proportionate change in demand was found to be greater than the proportionate change in price, so that a fall in price led to an increase, and a rise in price to a decrease, in the total value of sales; where it is less than 1, the opposite was found to be true.

8. In view of the small number of calculations relating to any one commodity, and of the divergencies in time, place and method of the calculations, caution is required in drawing conclusions from the above table. It may be noticed, however, that, of the protective foods included, fresh eggs showed a very high elasticity of

¹ Professor J. TINBERGEN, " L'élasticité de la demande des produits des industries agricoles ", Congrès international des Industries agricoles, Scheveningen, 1937.

Table II.
Calculations of Elasticity of Demand.

Commodity	Country	Period	Source	Other factors included in calculations and remarks on methods ^a	Elasticity
Fresh butter	Netherlands	1929-1930	<i>Ned. Conj.</i> , Dec. 1931, page 22	Seasonal variations. Wholesale prices used	<i>Circa</i> . . . 1 Summer . . . 0.8 Winter . . . 1.6
Fresh eggs	Netherlands	1930	<i>Ned. Conj.</i> , March 1931, page 29	Seasonal variations. Wholesale prices used	<i>Circa</i> . . . 2 Spring . . . 0.9 Autumn . . . 7.0
Pork	Netherlands	1924-1934	<i>Ned. Conj.</i> , May 1935, page 15	Income and beef prices (both deflated by cost of living)	<i>Circa</i> . . . 2.5
Beef	Netherlands		<i>Ned. Conj.</i>	Income and pork prices	<i>Circa</i> . . . 1.2
Sugar	Netherlands	1921-1934	Weinreb Stat. be-paling v. d. vraag-curve	Income. Several methods used for deflating prices and incomes and for determination of trends	0.3 (all figures between 0.15 and 0.7)
Potato flour	Netherlands (exp.)	1921-1930	<i>Ned. Conj.</i> , March 1933, page 22	Potato crop in competing countries ; general economic activity	0.5-1.7 1.2-4.7
Potato flour	Netherlands (ex-ports to U.S., U.K. and Bel-gium)				
Beef	United States	1922-1933	SCHULTZ, J. P. E., 1935, page 4	Income; prices of pork and mutton. All deflated by cost of living	0.83
Pork	United States	1922-1933	SCHULTZ, J. P. E., 1935, page 4	Income; prices of beef and mutton. All deflated by cost of living	0.70
Mutton	United States	1922-1933	SCHULTZ, J. P. E., 1935, page 4	Income, prices of beef and pork	1.9
Sugar	United States	1890-1914	SCHULTZ, J. P. E., "Stat. Laws of Supply and Demand"	Trend eliminated. Prices deflated by wholesale-price index	0.5
Potatoes	Belgium (workers only)	1891-1932 ^b	STAEHLE (unpub-lished)	Prices deflated by cost of living (family budget data used)	0.09 1.27
Sugar					
Butter	Great Britain	1923-1933	R. COHEN, "The History of Milk Prices"	Real income	<i>Circa</i> . . . 1
Cheese					1933. . . . 0.5
					1924. . . . 1.6
					1923. . . . 0.6
	1933. . . . 0.3				

^a *I.e.*, in addition to quantities and prices (retail). ^b Only for five separate years in which family budget enquiries were made. ^c The elasticity here was positive, showing an increase in price to give rise to an increase in demand.

demand, and butter an elasticity of about 1 in both examples. The relatively high meat elasticities are probably related to the considerable substitution possibilities. Of the non-protective foods included, sugar shows a fairly low elasticity in two out of the three examples, and potatoes even show a positive elasticity—*i.e.*, a rise or fall in price was found to be accompanied by a movement of consumption in the same direction. Other calculations regarding non-protective foods have been made by Professor SCHULTZ,¹ which show, on the whole, low price elasticities; he obtained the following elasticities for wheat, sugar and potatoes in the United States at three consecutive periods:

	1875-1895	1896-1914	1915-1929
Wheat	0.13	0.01	0.27
Sugar	0.38	0.27	0.31
Potatoes	0.66	0.27	0.31

In every case except one covered in the table on page 191 a negative elasticity was found—*i.e.*, a fall in price led, *ceteris paribus*, to an increase in the amount demanded, and *vice versa*. The one exception was the very small positive price elasticity for potatoes already mentioned. Apart from the possibility of a change in tastes, this could be explained by the fact that a fall in the price of potatoes enabled Belgian workers to satisfy their most pressing hunger more cheaply than before, so that money became available for the partial replacement of potatoes by other foods. Similarly, a rise in potato prices involves a fall in real income, and may be accompanied by the increase in the relative or absolute consumption of potatoes, which is a not unusual accompaniment of a reduction in real income.²

9. Several different methods of establishing demand curves are represented in the above list. Most calculations have been based on national consumption figures and retail (or occasionally wholesale) prices. Two, however, have made use of family budget data; families with "equivalent incomes" (established by means of a special cost-of-living index³ have been selected from successive

¹ Professor H. SCHULTZ: "The Shifting Demand for Selected Agricultural Commodities, 1875-1929", *Journal of Farm Economics*, April 1932.

² An analogous case of a positive price elasticity for margarine in Germany was pointed out by SINGER and ROSS (*Inst. d'Hyg. de l'Univ. all. de Prague*, t. II, 1932).

³ The method of calculating equivalent incomes at different periods is described by H. STAEBLE in "A Development of the Economic Theory of Price Index Numbers", *Review of Economic Studies*, June 1935.

family budget enquiries, and the relation between retail prices and the consumption of these families has been observed. This method makes it possible to calculate the elasticities of demand pertaining to different income groups, which is likely to be of more importance for nutrition policy than the elasticity for the market as a whole; the method is, however, applicable only in countries where extensive family budget studies have been made at fairly close intervals, since otherwise changes in taste may obscure the true price elasticity.

10. In explaining the consumption of any particular article of food, other factors besides its own price may play an important rôle. Among the main factors to be taken into account are the distribution of families by income and the prices (or supplies) of goods whose consumption is related to that of the commodity in question. Changes in tastes leading to a long-term shift in the whole demand curve may be taken into account, either by introducing "time" as a specific variable or by eliminating a trend in other variables.¹

11. The diagram on the opposite page shows total demand curves for butter and cheese in the British market, after the influence of income has been eliminated:²

The studies made showed that, during the period covered, whatever the price prevailing, a rise or fall in the price of butter of 1*d.* per lb. decreased or increased demand, on the average, by the same *absolute* amount—39,000 cwt.—and that a rise or fall in the price of

¹ Cf. Henry SCHULTZ: "The Shifting Demand for Selected Agricultural Commodities, 1875-1929", *Journal of Farm Economics*, April 1932.

² From R. COHEN, "The History of Milk Prices", Oxford, 1936. Data covering the years from 1923 to 1933 yielded the following multiple correlation equations:

$$P_B = 20.0374 - 0.002559 Q_B + 0.1634 M$$

$$\text{and } P_C = 23.4626 - 0.007496 Q_C + 0.17544 M$$

where P_B and P_C represent the price in pence per lb. of salt butter and cheese respectively; Q_B and Q_C the total supplies of butter and cheese in thousand cwt. and M an index of spending power (1933 = 100). To obtain the influence of price on consumption by itself, the 1933 value of the purchasing power index was inserted in each equation, and the retail prices from 1923 to 1933 corrected to allow for changes in purchasing power during the period. The resulting demand curves were

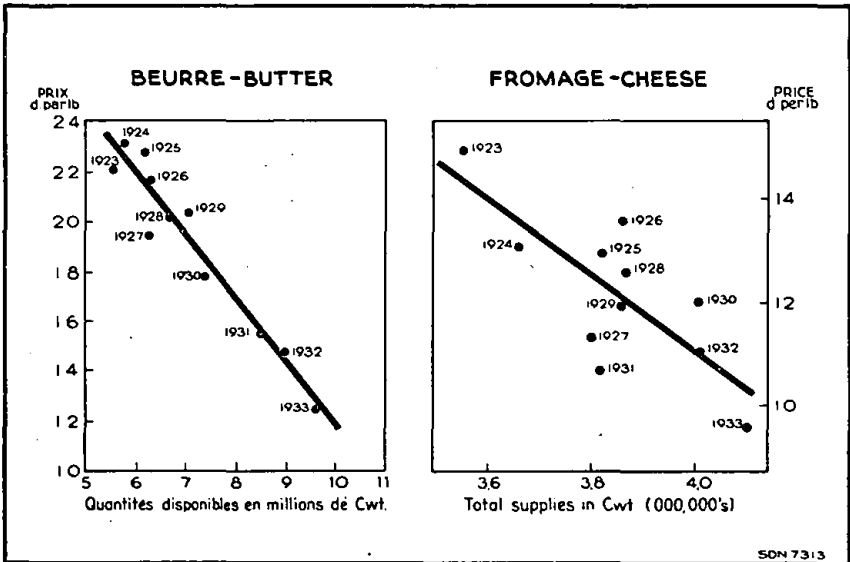
$$P_B = 37.2780 - 0.002559 Q_B$$

$$\text{and } P_C = 41.0067 - 0.007496 Q_C$$

cheese of *id.* per lb. decreased or increased demand, on the average, by 133,000 cwt. Since the change provoked by a given change in price remained constant whatever the absolute level of consumption, it is obvious that the *elasticity* (*i.e.*, relation of proportionate change in demand to proportionate change in price) was greater when total consumption was relatively low (and prices high) than when total consumption was relatively high (and prices low). It may be presumed that the greater the consumption the nearer has satiation-point been reached, so that the less is the inducement to increase purchases as a result of lower prices, and conversely the greater the tendency to reduce purchases as a result of higher prices.

Diagram IV.

RELATION BETWEEN RETAIL PRICES AND TOTAL SUPPLIES OF BUTTER AND CHEESE WHEN SPENDING POWER IS MAINTAINED AS IN 1933 (UNITED KINGDOM 1923-1933).



12. Little exact information is available regarding the elasticity of demand for milk, but, in general, the response of consumption to changes in price has been found to be fairly low. In New York City between 1919 and 1924, it was recorded that eleven decreases of 1 cent per quart in the retail price of the staple type of milk retailed (an average price change of $6\frac{1}{2}\%$) were followed by

average increases in the sales of six of the largest distributors of only 0.6% of normal sales; in the same period, ten price increases of 1 cent (representing an average price change of 7%) were followed by decreases of sales of only 0.4% of normal sales. It appeared, however, that, when the price rose above a certain level (about 17 cents per quart), a sudden increase in elasticity occurred; a price rise of 2 cents to 18 cents per quart was on one occasion followed by a decline in consumption by 6.5% of the normal level, and a rise in price of 1 cent (also to 18 cents) was on another occasion followed by a fall of 5% in demand.¹

13. So far as can be gathered from the very sparse data available, the elasticity of demand for liquid milk in England appears to be somewhat greater than that in the United States. This is probably related to the relatively low *per caput* consumption in the former country. "A number of large retailers state that the spring fall of 1*d.* a quart usually stimulates their sales by anything from 5 to 20%, this increase being lost again in winter".² Part of this reaction may be due to a seasonal change in demand unrelated to price.

The Milk Reorganisation Commission Report³ expresses some doubts regarding the apparent inelasticity of demand for milk in England. It points out that the long-term effects of price changes are probably greater than suggested by the recent maintenance of demand in the face of an increase in milk prices.

"Any increase in the retail price of milk is bound to be a matter of moment to consumers, and particularly to those whose budget allowed for only a small quantity of fresh milk even before the rise in price. The price increases have necessarily had their greatest effect on the poorest consumers—that is, on those whose consumption was already far below the general standard for the country".⁴

¹ H. A. ROSS: "The Demand Side of the Milk Market". Bull. 450, Cornell University Agricultural Experiment Station, 1927; quoted in R. COHEN, "A Survey of Milk Marketing Schemes and Price Policies", Univ. of Cambridge, Dept. of Agriculture, Farm Economics Branch Report No. 20, 1933.

² R. B. FORRESTER: "The Fluid Milk Market in England and Wales". Min. of Agriculture and Fisheries, Economic Series, No. 16, 1927, page 109.

³ Ministry of Agriculture and Fisheries, Economic Series No. 44, 1936.
⁴ *Op. cit.*, pages 109 and 110.

“The [Consumers’] Committee has expressed to us the opinion that a reduction in the price of milk would lead to increased consumption and that, in view of the benefits that such increased consumption would have on the health of the community, every endeavour to this end should be made.”

It would nevertheless appear that, in view of the vital importance of assuring an adequate level of milk consumption, too much reliance should not be placed on price policy as a means of stimulating demand. Other methods, in particular publicity and free or subsidised distribution of milk to certain sections of the community, may be called for to supplement and reinforce the policy of reducing milk prices.

14. The availability of substitutes for fresh milk and cream, such as condensed or dried milk and tinned cream, may tend to increase their elasticity of demand. An example of the substitution of skimmed for full milk following a price increase is reported from a local Consumers’ Co-operative Society in Graz, Austria.

Table III.

PRICES AND SALES OF FULL AND SKIMMED MILK (GRAZ, AUSTRIA).

	<i>Full milk</i>		<i>Skimmed milk</i>	
	Price Groschen	Sales Litres	Price Groschen	Sales Litres
1933	36	230,000	10	—
1934	42	112,000	10	1,635
1935	42	81,000	10	4,204
1936	42	79,000	10	12,222

15. The importance of the elasticity of substitution in another sphere may be illustrated by the reactions of consumers to changes in the relative prices of various meats.¹ Beef, mutton and pork serve roughly similar purposes, both from the point of view of nutrition and from that of the palate. The responses of consumers to changes in meat prices in the United States and in Canada are shown in Diagram V below.

16. The more perfect the substitute, the greater the elasticity of demand. Diagram VI shows the influence on consumption of movements in the relative price of two sorts of butter (almost perfect substitutes) sold in the United Kingdom.

¹ See also Part III, Chapter 1, paragraph 27, above.

Diagram V.

PRICES AND CONSUMPTION OF VARIOUS MEATS.

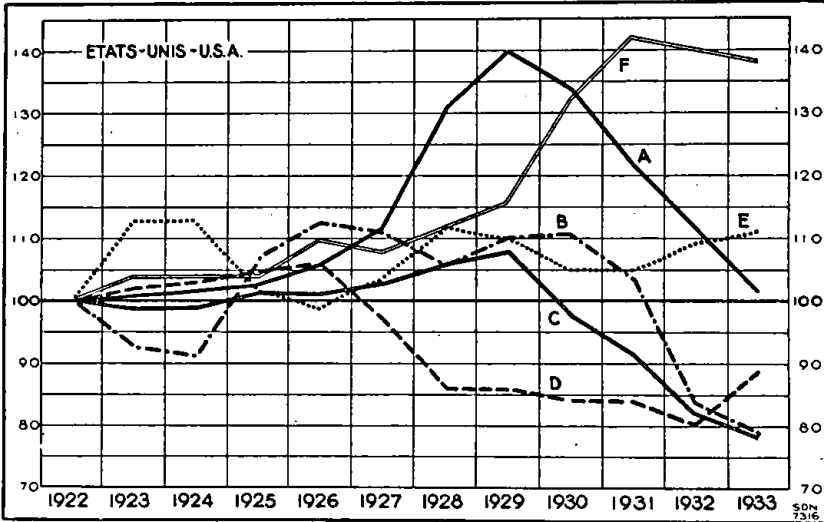
Prices deflated by total
food cost index:

- A Beef and veal
- B Pork
- C Mutton and lamb

Consumption:

- D Beef and veal
- E Pork
- F Mutton and lamb

(1922 = 100.)



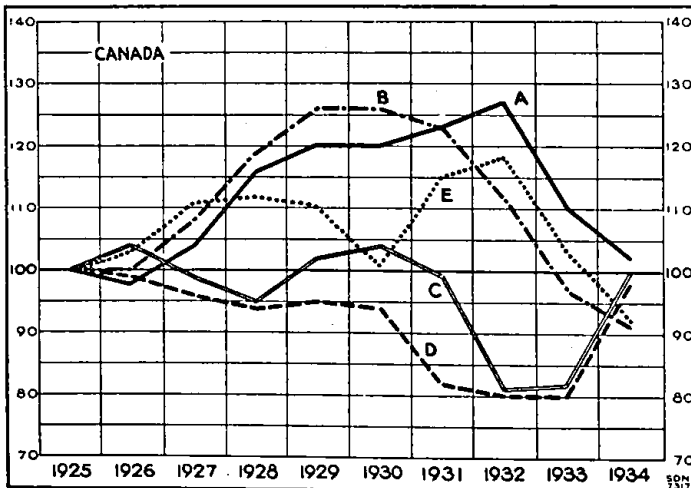
Prices deflated by total
food cost index:

- A Beef
- B Veal
- C Pork

Consumption:

- D Beef and veal
- E Pork

(1925 = 100.)

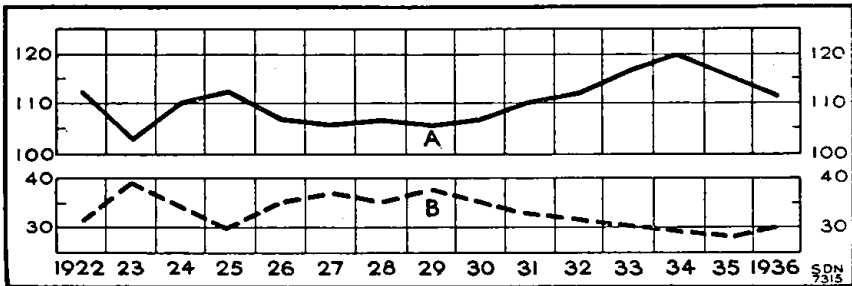


It appears that, whenever the price of Danish and Dutch butter rises relatively to that from Australia and New Zealand, the butter imports from Denmark and the Netherlands show a relative fall and

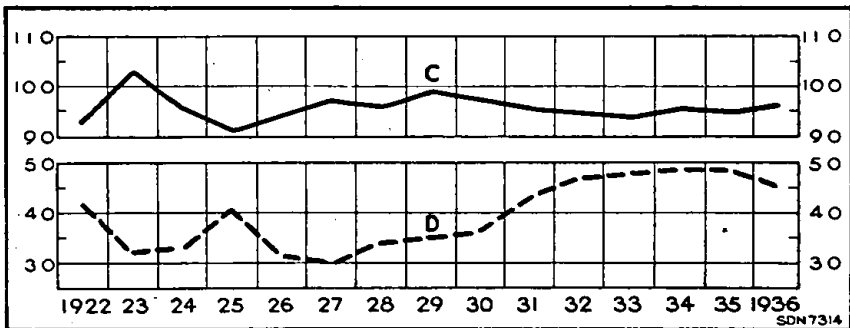
Diagram VI.

PRICES AND CONSUMPTION OF EMPIRE AND FOREIGN BUTTER
IN THE UNITED KINGDOM.

- A $\frac{\text{Average of prices of Danish and Dutch butter}}{\text{Average price of all butter.}}$
 B $\frac{\text{Butter imports from Denmark and the Netherlands}}{\text{Total butter imports.}}$



- C $\frac{\text{Average of price of Australian and New Zealand butter}}{\text{Average price of all butter.}}$
 D $\frac{\text{Butter imports from Australia and New Zealand}}{\text{Total butter imports.}}$



those from Australia and New Zealand a rise; the contrary movement follows a fall in the relative price of Danish and Dutch butter. The fact that, in spite of the good correlation, the elasticity is not higher implies that consumers either do not regard European and Australasian butter as exactly the same commodity, or else that they are slow to react to changes in relative prices.

17. The influence of prices on consumption is of importance in connection with seasonal differences in diet. Certain foods, particularly those of high nutritive quality, such as dairy products, fruit and vegetables, are subject to considerable seasonal fluctuations in supply and price. The result is frequently to produce variations in the consumption of important nutrients which by no means correspond to changes in physiological requirements.

Diagram VIII shows the seasonal movement of the prices paid and of the consumption of butter and eggs by workers and officials' families in Prague.¹ It may be noted that more extreme seasonal fluctuations appear in the butter consumption of workers than in that of officials.

It would appear possible to iron out to some extent excessive seasonal movements in consumption by improved methods of conservation and storage and by spreading information both regarding these techniques and regarding seasonal price movements.

18. The responsiveness of consumption to changes in prices may be different according to the direction in which the change takes place. Situations may arise where, for instance, a small reduction in price leads to a considerable expansion of consumption, but where a subsequent rise in price is not followed by a corresponding fall in consumption. The reason may be that a habit has been formed, so that deprivation of the commodity has become a greater hardship than before the pleasures of increased consumption had been tasted.

19. It is clear that elasticity of demand in general can be influenced to a considerable degree by nutritional education of consumers. It may be expected that, as a realisation of the essential nature of the nutritive qualities of protective foods becomes widespread among the consuming public, not only will the absolute amount of their consumption increase, but also its elasticity will become less—*i.e.*, consumption will be less likely to fall off as a result of small rises in price. So long as fruit and fresh vegetables are regarded as delicacies, and butter merely as a slightly better tasting equivalent to margarine, one may expect a sharp shrinkage in demand to follow a rise in the prices of these

¹ From *Mitteilungen des Statistischen Staatsamtes der Tschechoslowakischen Republik*, 1931, Nos. 33-36.

Diagram VII.

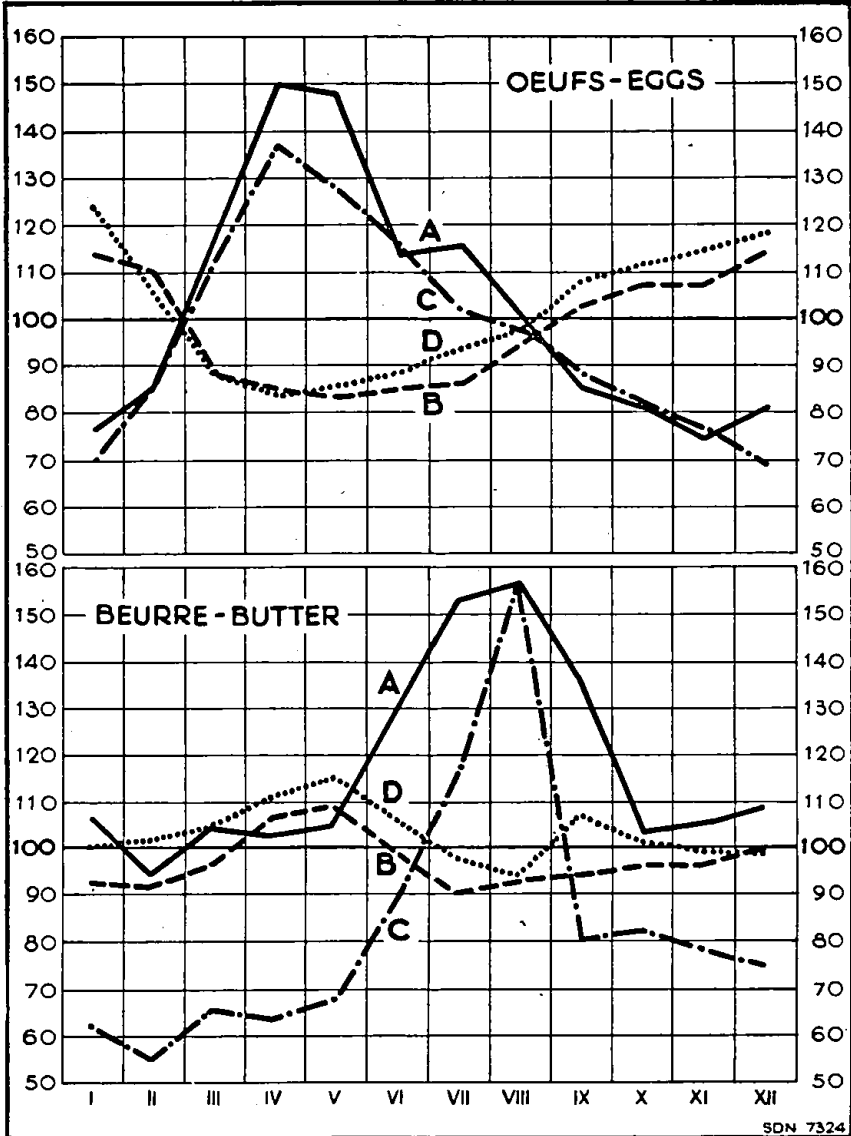
SEASONAL MOVEMENT OF PRICES AND CONSUMPTION:
BUTTER AND EGGS.

Czechoslovakia.

Consumption per consumption unit for:

A Officials.
Price paid by:
B Officials.

C Workers.
D Workers.



commodities; but, if it is realised that these foodstuffs serve to build up resistance to disease and promote general health in a way that other, cheaper foods do not, efforts will be made, in so far as incomes permit, to meet a rise in their prices by economising on other less vital expenditures.

In short, with an expansion in the consumption of protective foods to more nearly adequate levels, and with the spread of nutritional knowledge, it may be expected that the elasticity of demand for protective foods will grow to resemble more closely that of the non-protective foods.

20. The elasticity of demand is dependent partly on the level of income.¹ The type of dependence will, however, vary according to the nature of the commodity. In the case of most foodstuffs, where satiation tends to be reached at relatively low incomes, it may be expected that elasticity will decrease with increasing consumers' incomes. For commodities for which efficient substitutes are available, however, elasticity might be greater for higher incomes, where expenditure is spread over a larger range of items, thereby increasing the scope for substitution.²

21. The fact that elasticity of demand for protective foods is likely to be higher among the lower-income groups of the community, and that it is precisely these groups which are in most danger of malnutrition, suggests that consideration should be given to the possibility of discriminating prices as a means of stimulating consumption in certain cases. It may be that a small reduction in the general price of milk would not lead to an appreciable expansion of consumption, while a somewhat larger reduction applied to a small section of the market whose milk consumption was particularly inadequate might have better results, at the same, or even less, cost to producers or to the State. This consideration has led authorities in several countries to supply milk at much reduced prices to children in schools, to nursing and expectant mothers, or to the unemployed. For instance, a scheme for

¹ It is for this reason that particular importance should be attached to methods of calculating the elasticity of demand, such as that mentioned in paragraph 9 above by means of which the elasticities referring to specific income levels can be obtained.

² Cf. BOWLEY and ALLEN: "Family Expenditure" (London, 1935, page 125).

supplying milk to children and mothers in a depressed area (Rhondda Valley) in Wales at *2d.* per pint is financed by reducing the distributors' margin from *10d.* to *8d.* per gallon and granting a subsidy of $3\frac{1}{2}d.$ per gallon from the Commissioner for the Special Areas. In the Netherlands, preserved meat, margarine, fresh vegetables and fish have been distributed to the unemployed at prices considerably below those ruling in the market. In the United States, the principle of "class prices" has been introduced in several fields of the economy.

Price discrimination may be financed by subsidy, by charging higher prices on part of the sales, or by a differentiation of presentation or of the service of distribution. Thus, bread or milk may be sold more cheaply over the counter than when delivered at the door.

Chapter 4.

FACTORS INFLUENCING FOOD PRICES.

A. INTRODUCTORY.

1. In the previous chapter, some indications have been given of the influence of food prices on consumption; it remains now to consider the main factors determining the level of food prices.

2. In general, price may be regarded as an index of the degree to which potential demand for a commodity can be satisfied by the available sources of supply. The previous chapters have shown the influence of a number of factors affecting the potential demand for certain foodstuffs (for example, movements of incomes, an increased desire for "protective foods" and a relative or absolute decrease in the demand for non-protective foods) and, at the same time, other factors affecting the availability of supplies (for example, technical progress in production and transport, developments in commercial policy, etc.). These influences on the supply and demand side have reacted mutually on one another through the medium of price. In Chapters 5 and 6, the income and education influences on the demand side are discussed. In the paragraphs which follow, a brief account is given of the factors determining the conditions of supply of foodstuffs. These may be roughly classified under four heads: technical costs of production; commercial policy; production and price policy; and costs of distribution (including marketing and transport).

B. EFFICIENCY AND COST OF PRODUCTION.

3. In Chapter 3, it has been demonstrated that lower food prices to the consumer (*i.e.*, cheaper calories) tend—money incomes and other things being equal—to result in an increase in the consumption of protective foods, while higher food prices are likely to have the opposite effect. It by no means follows from this demonstration, however, that the way to secure a general all-round improvement in nutritional standards is to force down the price

which farmers and other producers of primary foods get for their products to non-economic levels. Farmers also eat; and no one would wish that they should eat less or worse in order that the industrial population eat better. Moreover, from the point of view of general welfare, the prosperity and purchasing power of the buyers of food are intimately bound up with the prosperity of the producers of food. If the latter have their incomes cut through reductions in price uncompensated by reductions in cost, they are clearly less able to buy industrial goods; and the employment, income and nutrition of industrial workers are likely to be adversely affected. If cheap food were in itself a panacea, the years 1930 to 1933 would have represented a millennial period in many countries.

4. It may therefore be taken as axiomatic that a comprehensive and well-considered nutrition policy should not be of a nature to cause losses to food producers, nor should its effect be to force the prices of food products below levels which cover the costs¹ of the marginal producer whose output is required to meet current demand and give him a fair return on his labour and investment.

5. The income of the producer depends upon the relationship between the price he obtains, his costs of production, including fixed charges and taxation, and his volume of sales. The return to the farmer will fall if prices decline as a result of "external" factors or if costs are increased. One of the main factors bringing about the drastic fall in agricultural prices during the depression was the cumulative falling-off of monetary demand; it would seem to be an important task of policy to prevent excessive fluctuations in producers' prices originating in this way. Among the factors tending to increase costs in recent years, special reference must be made to the burden of taxation. Fiscal policy necessarily plays an important part in influencing producers' costs and consequently food prices. Where a fall in prices is due, not to a shrinkage of demand, but to increased production accompanied by a reduction in costs, no loss to the producer is involved. On the contrary, the consumption of his product is likely to rise with the reduction in price: more will be sold and the return to the producer will be increased.

¹ The problems raised by the differences in costs of production in different countries are reserved for separate treatment in the next section.

6. It is therefore clear that, from the point of view of nutrition policy, as well as from the point of view of the interests of agriculture, great importance is to be attached to any steps which can be taken to increase the efficiency of food production and distribution and so enable food prices to be lowered without reducing the net return to the producer. The factors determining efficiency and cost of production are varied and complex; and it is not possible to do more than stress the importance of this question here. In the previous chapters, several examples have been given of remarkable improvements in agricultural methods which have occurred in recent decades. The effect of these improvements is to reduce costs and make greater supplies available at a given price than previously. There remains great scope for the application of scientific knowledge and the increased use of fertilisers in agriculture in practically all parts of the world. Through encouraging improvements in agricultural technique, Governments and agricultural co-operative societies can make an important contribution to raising general nutritional levels.¹ In this connection, the education of the agricultural population is of primary importance. The countries where the greatest advances in efficiency have been made in recent years are those, such as Denmark, where the standard of education among the rural population attains a very high level.

C. COMMERCIAL POLICY.

7. In addition to efficiency of production, the conditions under which foreign food supplies are allowed to enter national markets constitute an important influence on food prices. These conditions as expressed through commercial policy, determine the extent to which such benefits as can be obtained from the international division of labour in food production may be enjoyed by consumers in general.

8. It would go beyond the scope of this report to attempt to give a detailed account of the development of the international trade in foodstuffs and of the interferences with that trade. Differences in the efficiency and cost of agricultural and other

¹ For an exposition of the important part played by agricultural co-operative societies in increasing the output and improving the quality of certain foods, see International Inter-Co-operative Committee: "The Co-operative Movement and Better Nutrition" (published by International Labour Office, Geneva, 1937).

forms of primary production in different parts of the world led to a great expansion of the trade in basic foods in the course of the nineteenth century and early twentieth century; with the development of transport and refrigeration, supplies could be drawn from parts of the world where natural or technical conditions were most favourable. It has been argued in Part III, Chapter 1, above that this broadening of the area of supply was one of the principal factors accounting for the improvement in nutrition standards in Europe. One need only consider the influence which the international trade in wheat, meat, butter and citrus fruits exercised on the standards of consumption in some countries to be impressed with the importance of this factor.

9. In many European countries, however, the cheap foreign supplies were regarded as threatening the stability of domestic agricultural systems, and protective tariffs against food imports began to spread on the Continent in the last quarter of the nineteenth century. Thus, the German tariff of 1879 imposed greatly increased duties on grain and live-stock. A moderate tariff instituted in France in 1881 soon gave way to higher duties on wheat, other cereals, flour, live-stock and meat. Italy, Austria-Hungary and Switzerland all protected their agricultural systems. The United Kingdom stood clear of the protectionist movement until recent years. Denmark, maintaining a system of free trade except for cheese, shifted from cereal to dairy production and animal husbandry; her example was followed by the Netherlands—where low duties were imposed on food imports, while grains, feeding-stuffs, bacon, pork and mutton were admitted free—and, to a lesser extent, by Belgium, where a low tariff was imposed, favouring live-stock. Towards the beginning of the present century, world prices of agricultural produce started to rise rapidly, and there was no noticeable increase of agricultural protection in Europe in the decade preceding the great war.

10. Though agricultural protection is not a new phenomenon, food duties in pre-war and immediate post-war Europe must be characterised as moderate compared with the situation which has developed during the past decade. Not only have import restrictions become much more severe in the countries which formerly afforded a limited protection to their food-producers, but the

United Kingdom, the Netherlands, Denmark and Belgium have abandoned their traditional low-tariff or free-trade policies.

It is difficult to set an exact date to the beginning of the present phase of agricultural protection in Europe: the principal development occurred during the period of economic depression beginning in 1929; but the tendency can be discerned as early as 1925. When Germany regained her full tariff autonomy in that year, she reimposed high duties on food imports, and these were continually raised during the next four years. French duties on agricultural products were raised in 1926 and 1927; Italy reimposed a wheat duty in 1925, which was raised in subsequent years.

II. After the middle of 1929, restrictions began to multiply and spread. The facts regarding the recent development of agricultural protection are so well known that it is unnecessary to recount them in detail. The Economic Committee of the League of Nations has recently studied this question, and the following passages are extracted from its report:¹

“ For several years after the close of hostilities, Europe continued to import considerable quantities of agricultural products—particularly cereals and meat—her return to her former productive capacity having been retarded by a series of concomitant causes, such as the Russian revolution and numerous agrarian reforms.

“ But directly her producing capacity was again restored, about 1925, the balance between supply and demand was broken; prices were already on the downgrade, and the full force of the collapse was felt from 1930 onwards.

“ Exporting countries with a surplus of goods had to bear the full shock of this catastrophe, against which they possessed only one means of defence—a useful means at first, but one which was later to constitute an additional danger—namely, to slow down the marketing of their crops by accumulating stocks.

“ On the other hand, agricultural producers in the importing countries with a shortage of crops were obliged to appeal to their Governments and to national solidarity in order to escape the contagion. This means they have used, and abused: the introduction of duties two or three times higher than world prices, ever stricter rationing, the progressive reduction to close upon vanishing-point of the proportion of foreign products admitted in the various preparations, bounties for production, export bounties, ‘ schemes ’, monopolies and various other forms of planned economy.

“ These Draconian measures, which, quite apart from the disorder which they caused in the delicate and complex mechanism of the balance of international accounts, tend to create as many different price regimes as there are protectionist countries and thus delay a return to the essential system of non-watertight

¹ League of Nations, Economic Committee: “ Considerations on the Present Evolution of Agricultural Protectionism ” (Geneva, 1935).

compartments, were followed by a whole series of difficulties, perhaps less serious but almost as irksome. Quotas have to be allocated as between the countries; hence the danger of discrimination. Quotas have to be allocated as between the traders, and allocation is necessarily synonymous with delay, confusion, error, abuse, *de facto* monopoly and sometimes corruption. The whole body of sanitary measures, applied with the utmost severity, creates a suspicion that those measures have economic objects, and one cannot understand why international co-operation, which is making such strides in the matter of human hygiene, should remain powerless in regard to animal hygiene.

“ The consequence of all these measures, applied more particularly by the big industrial countries, was naturally a big-scale reduction, amounting in some cases to the total exclusion, of agricultural imports, and that more particularly in the case of products—such as wheat, meat and butter—playing a fundamental part in the economic life of the producing countries.

“ Had it achieved its object, it would be difficult indeed to criticise [this policy]; but facts are to hand which prove that this exaggerated policy of protectionism, spreading from one country to another, is tending to prolong the depression which it was designed to combat and to prejudice the interests of the classes that it aimed at protecting. In its present extreme form, it no longer has anything in common with a moderate protectionism, which is quite compatible with the normal functioning of international trade.

“ With the advent of the economic depression which set in in 1929, the majority of countries, threatened by the complete breakdown of international economic equilibrium, sought a remedy in the application of methods which were useful only when they did not exceed certain limits. There thus ensued, first, a progressive increase of duties, followed by the establishment of a system of restrictions practically excluding all imports of certain important agricultural commodities.

“ The inevitable consequences of these methods were not slow in making themselves felt. Several important countries which in previous years had still imported large quantities of wheat and other cereals increased their production so as fully to cover their requirements. Often, indeed, they found themselves with large excess amounts, which led to the collapse of prices and obliged the Government to dip into State funds again in order to constitute stocks, give bonuses for denaturation, export, etc. Billiards are being spent in this way because, having benefited for a long time by artificially increased prices, the farmers have naturally been led to increase by every possible means a production thus privileged.

“ On the basis of post-war experience, it is safe to affirm, without fear of contradiction, that an industrial country, which always requires to maintain the closest relations with other countries, will never be in a better position than if it succeeds, by means of moderate protection, in keeping the prices of the chief agricultural commodities, and particularly wheat, at a reasonable level which will prevent over-production and enable it to retain the ample possibilities in regard to agricultural imports. This policy is undoubtedly the wisest, both in time of peace and in anticipation of possible conflicts.”

12. The principal motives behind the recent increase in restrictions on food imports have been the desire to defend national agricultural systems and maintain the farmers' income; the safeguarding or improvement of trade—in some cases with a view to securing an export surplus in order to pay the service of foreign debts, and in others to protect the foreign-exchange reserves and prevent currency depreciation; the desire for economic self-sufficiency (autarchy); revenue considerations, especially in the case of duties on colonial products, such as tea and coffee; and, finally, retaliation against foreign tariffs or against dumping.

13. The methods adopted for protecting agriculture have undergone a considerable evolution during recent years. Before the war, and up to 1929, tariffs were the principal method used in restricting imports. In recent years, not only have tariffs been raised to record levels in most European importing countries, but they have also been supplemented by other and more drastic methods of restricting imports which insulate domestic price-levels more completely from the movement of world prices. Among the most important of these direct methods are quantitative restrictions on imports in the form of quotas or contingents. Rarely used before the depression, this type of restriction became increasingly important after the financial crisis of 1931. Its use was most general in the countries maintaining their currencies at the gold parity without exchange control, and quotas were applied to a wide range of foodstuffs in France, the Netherlands, Switzerland and Poland. Since the devaluation of the currencies of the first three countries, there has been some tendency to enlarge certain quotas and allow more foreign goods to be imported in order to prevent too rapid a rise in the cost of living; the quota system is, however, maintained.

14. Another method of restriction which has become quite common in parts of Europe in recent years is the licensing of imports, which is sometimes used in connection with the quota system and sometimes as an independent method of administrative protection. Under this method, a Government licence is required in order to import. In the United Kingdom, a licensing system is in force in connection with the meat quotas; in France, it is used in connection with the wheat quota and milling regulations; in Czechoslovakia,

the licensing of imports of wheat and rye is in the hands of the Grain Monopoly.

15. It is not necessary to describe here all the methods of agricultural protectionism, such as milling regulations, sanitary regulations and import monopolies. Special reference must, however, be made to exchange control. Originally imposed to control capital flight and prevent exchange depreciation, the official control of foreign-exchange transactions has become a protective device of great severity and effectiveness in certain European countries. Closely connected with exchange control is the system of clearing agreements; the tendency of these agreements is to equalise trade between the two countries concluding them, even at the cost of one country buying goods at relatively high prices. Though they are intended as an alleviation of exchange control, they may, therefore have the effect of raising food prices to the consumer of the food-importing country.

Effects of Agricultural Protectionism.

16. The effects of the restrictions on the international trade in food are of two kinds: first, on the volume of trade, prices and consumption and, second, on the volume and kind of production and the structure of domestic agricultural systems.

It can easily be shown that trade restrictions must normally increase consumers' prices under the conditions of supply and demand that usually prevail for foodstuffs—*i.e.*, conditions under which (1) an increase in price leads to a reduction of demand and (2) increased supplies are forthcoming only at higher prices.¹

¹ Fig. 1. — Domestic supply.

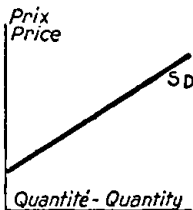


Fig. 2. — Foreign supply.

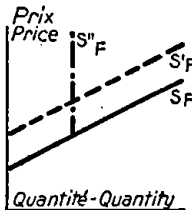
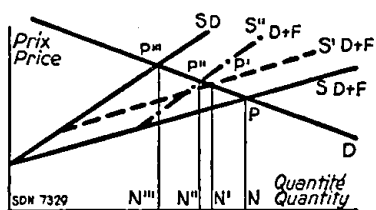


Fig. 3. — Demand and total supply.



D represents the demand curve of the importing country, S_D its domestic supply curve (Figure 1) for the commodity in question, and S_F the foreign supply curve [Note continued on following page.]

It is not possible to demonstrate with scientific accuracy this obvious relation in concrete cases, because commercial policy is only one of several factors influencing prices. The relation does, moreover, not necessarily hold in all cases in the long run; it is possible that temporary protection may facilitate the development of more efficient home production and thus eventually reduce prices.

Table I.
RETAIL PRICES OF FOODS, IN SWISS FRANCS.

October 1936.

Countries (unweighted averages)	Wheat flour (kg.)	Beef		Pork		Bacon (kg.)	Milk, unskim- med (litre)	Fresh butter (kg.)	Fresh eggs (units)	Dried peas (kg.)
		First quality (kg.)	Second quality (kg.)	First quality (kg.)	Second quality (kg.)					
Argentina (Buenos Aires) . . .	0.28	0.98	0.86	0.97	0.88	0.95	0.17	1.70	0.05	1.75
Australia (2 towns)	0.32	1.46	—	1.61	—	2.38	0.42	2.65	0.09	0.70
Austria (2 towns)	0.60	2.27	1.91	2.64	2.03	2.36	0.34	3.74	0.13	0.80
Belgium (Brussels)	—	3.67	1.59	2.93	1.80	1.80	0.22	3.05	0.13	0.50
Canada (6 towns)	0.39	1.81	1.17	2.13	1.98	2.95	0.42	2.78	0.12	—
Czechoslovakia (2 towns) . . .	0.43	2.21	1.74	2.21	1.78	2.45	0.24	2.69	0.11	0.60
Denmark (Copenhagen)	0.30	2.29	1.30	1.41	—	2.49	0.31	2.61 ^a	0.11	—
Estonia (2 towns)	0.33	0.86	0.59	1.04	0.96	1.12	0.14	1.89	0.05	0.33
France (5 towns)	0.64	3.88	1.53	3.01	3.09	1.93	0.30	3.31	0.17	0.67
Germany (5 towns)	0.82	—	2.88	—	2.89	3.89	0.40	5.40	0.21	1.22
Great Britain (6 towns)	0.37	2.50	1.27	2.73	2.—	2.97	0.53	3.31	0.16	0.45
Hungary (Budapest)	0.23	1.99	1.64	1.42	1.28	1.64	0.22	2.26	0.08	0.43
Latvia (Riga)	0.42	—	0.53	—	1.01	1.29	0.14	1.79	0.09	0.38
Netherlands (4 towns)	0.47	2.47	2.19	2.12	1.49	1.65	0.23	3.89	0.12	0.51
New Zealand (3 towns)	0.32	1.36	1.13	1.53	1.53	2.37	0.32	2.30	0.09	—
Poland (3 towns)	0.41	—	1.14	—	1.16	1.30	0.17	2.47	0.08	0.29
Sweden (3 towns)	0.45	2.26	1.76	2.34	—	2.41	0.25	2.98 ^a	0.14	0.46
Switzerland (4 towns)	0.34	3.28	2.95	3.55	—	3.88	0.31	4.76	0.12	0.60
United States (8 towns)	0.47	2.73	2.01	3.48	2.88	4.01	0.56	3.91	0.15	0.87
Yugoslavia (5 towns)	0.29	1.22	0.92	1.52	1.22	1.46	0.25	2.75	0.10	1.—

^a Salted butter.

Continuation of note on preceding page.]

(Figure 2). In Figure 3, $S_{D + F}$ is the total supply curve, formed by a horizontal addition of S_D and S_F , and shows the amount of both home and foreign production forthcoming at various prices. Under conditions of free trade, the price will be PN, and consumption ON, determined by the intersection of the national demand curve with the total supply curve. If a specific tariff is imposed, the foreign, and therefore also the total, supply curve will be shifted upwards to the left (*i.e.*, at any given price, a smaller amount will be brought on the market) to S'_F and $S'_{D + F}$ respectively. Price is raised to $P' N'$ and consumption reduced to ON' . An *ad valorem* duty can similarly be shown to raise price and reduce consumption. In the case of a quota, the foreign supply curve becomes perpendicular S''_F , and the total supply curve $S''_{D + F}$ runs parallel to the home supply. Price is raised to $P'' N''$ and consumption reduced to ON'' . In the case of an absolute import prohibition, the total supply curve becomes identical with the home supply; price becomes $P''' N'''$, and consumption only ON''' . The effects of trade restrictions on a commodity of which there is no home supply is a special case of the above and can also be shown to involve price-raising and restriction of consumption.

17. In order to illustrate the extent of the differences in the retail prices of food in various countries, the table¹ above is given showing the prices of certain foods in twenty countries in October 1936.

It is, of course, not to be expected that retail prices would be identical in all countries. Even if there were complete freedom of trade, the cost of transport and retailing would result in differences. Moreover, there must be considerable differences in the quality of some of the foods represented in the above table. But these factors cannot account for the enormous international price discrepancies revealed in certain cases. These must be due in large measure to the restrictions which have been placed in the way of the international movements of food.

18. The following table compares, for the world as a whole, the changes in the quantum of food production and international trade in foods since 1929. The indices are computed by the Economic Intelligence Service of the League of Nations.

Table II.

WORLD PRODUCTION OF, AND TRADE IN, FOODSTUFFS.
(1929 = 100.)

Year	Production of primary foodstuffs	International trade in foodstuffs
1930	102	...
1931	100	...
1932	100	89
1933	102	83
1934	101	82
1935	101	85
1936	103	85

World production of primary foods remained consistently above the 1929 level in subsequent years, while the quantum of international trade in foods fell by as much as 15% between 1929 and 1933 and showed little or no recovery thereafter. These divergent movements reflect considerable changes in the geographical distribution of food production. The protection given to domestic producers stimulated food production in Europe, while the loss

¹ The prices on which this table is based are published in national currencies in the *International Labour Review*, March 1937. They have been converted to Swiss francs at the average rates of exchange prevailing in October 1936. In the case of Germany, the official rate of exchange has been used; this has, of course, the effect of making the figures for that country relatively high.

of export markets resulted in some contraction of production in certain other parts of the world. The movements of primary food production and changes in the continental distribution are summarised below:

Table III.

WORLD PRODUCTION OF PRIMARY FOODSTUFFS, BY CONTINENTS.

	Production of primary foodstuffs (1925-1929 = 100)		Geographical distribution of production of primary foodstuffs (Per cent of world production)		
	1932	1935	1929	1932	1935
Europe, excluding U.S.S.R.	107	115	37.5	38.9	40.0
North America	100	90	21.0	20.9	18.8
Asia	105	101	15.6	16.0	15.4
Latin America	100	101	8.2	8.3	8.4
Oceania	130	133	2.6	3.2	3.3
Africa	116	122	2.2	2.4	2.5

The main fact brought out in the above table is the steadily increasing importance of Europe as a centre of food production. The rise in European production is mainly due to the increased output in the industrial States which normally import a large part of their food requirements. The quantum of food imports into Germany, for example, was nearly 45% less in 1935 than in 1929, and this decline was replaced—at least in part—by domestic production. Similarly, Italy imported over 40% less food in 1934 than in 1929 and domestic production was greatly increased.

19. From the point of view of nutrition, the significance of this shift in the geographical distribution of food production lies in the fact that the industrial States of Europe are unable to produce food of the type formerly imported as cheaply as the exporting countries. The consumer is therefore forced to pay a higher price for food than would be the case if a larger proportion were drawn from abroad; and this higher price must inevitably tend to restrict the consumption either of the particular foods affected or of other foods.

20. In order to demonstrate that food prices have been kept at relatively high level in the countries which have restricted imports, it is not sufficient to concentrate attention merely on the absolute level of those prices, as they are influenced by other factors, such as currency policy and the general economic development, as well as commercial policy. It is preferable to study the relationship between food prices and other prices in order to show how the purchasing power of goods in general over food has changed. The

following table shows the yearly changes in the ratio of wholesale prices of food to wholesale prices of other commodities¹ in a number of countries—four of which export food and six of which are net importers. The relationship between the two series in 1929 is taken as 100, and when the figures given are less than 100, that means that food prices were relatively low—*i.e.*, that the purchasing power of other goods over food was greater than in 1929, and *vice versa*.

Table IV.

INDEX OF COST OF FOOD IN TERMS OF "OTHER COMMODITIES" AT WHOLESALE. ^a
(1929 = 100.) ^b

Year	Food-exporting countries			
	Canada	United States	Denmark	Australia
1930	86	97	98	91
1931	77	94	89	69
1932	72	85	87	68
1933	76	80	87	66
1934	84	85	87	71
1935	86	100	91	74
1936	90	96		79

Year	Food-importing countries					
	United Kingdom ^b	France	Germany	Italy	Czechoslovakia	Switzerland
1930	100	105	103	109	111	115
1931	101	125	116	122	108	125
1932	103	146	123	143	106	118
1933	95	125	119	126	125	112
1934	94	109	122	123	116	106
1935	96	108	120	128	113	105
1936	96	124	119	118	133	113

^a Official price indices are used in each case.

For the United States, the United Kingdom, Italy, Czechoslovakia and Switzerland, group indices of food prices have been available; for the other countries (except France), sub-groups showing price movements of particular categories of foods have been combined, without weighting, into a general index. For France, an index of agricultural products was used. These various indices were then divided by indices taken to represent the prices of commodities other than food. For the United Kingdom, France and Italy, indices of prices of industrial goods were available and were used. For the other countries, the sub-groups of the wholesale-price index relating to commodities other than food were combined, without weighting, into a general index. The indices thus arrived at were divided into the indices of food prices, both being based on 1929 = 100. For Italy, the food and non-food indices refer to primary products.

^b For the United Kingdom, 1930 = 100.

On account of differences in the methods by which the various national indices are constructed, no attention should be paid to small differences in the figures in the above table. But the large differences between the "real cost" of food in the exporting countries and in those importing countries which have sharply restricted imports can undoubtedly be taken as reflecting the fact that, in the latter,

¹ See footnote ^a to the table.

food prices to the consumer have been kept at relatively high levels as a result of the protection afforded domestic producers.

21. In order to illustrate in greater detail the effect of trade restrictions on food prices, it will be sufficient to take three examples of somewhat different types of food: wheat (a food of high energy value), maize (important as fodder crop as well as human food) and butter (a food of high protective value).

22. Of all the foods entering international trade, wheat has been the most subject to Governmental interference and control in recent years. Tariffs have been raised, import quotas and licensing systems imposed and domestic production directly subsidised in most European States. Thus, in France, the duty on wheat was raised from 35 to 83.20 francs per 100 kg. between the beginning of 1929 and the beginning of 1936; wheat can only be imported under licence, and millers must mix certain proportions of domestic with foreign grains. In Italy, the duty on wheat was raised from 40 to 75 lire per 100 kg. in the same period; milling regulations have been in force since 1931, and wheat can be imported only under licence. In Czechoslovakia, import duties were raised; a Grain Monopoly was established with power to license imports; milling regulations were imposed. In 1934 and subsequent years, an import duty of 2s. per quarter was imposed on foreign imports into the United Kingdom.

The following table shows the changes which have taken place in world trade in wheat and flour in recent years:

Table V.
WORLD TRADE IN WHEAT AND FLOUR, IN THOUSANDS
OF METRIC TONS. ^a

	Net exports			Net imports	
	1926/27- 1930/31	1934/35		1926/27- 1930/31	1934/35
Argentine	4,450	4,930	U.K. and Irish Free		
Canada	7,990	4,470	State	6,260	5,900
Australia	2,660	2,910	Italy	2,100	330
U.S.A.	4,170	— ^b	Germany	1,830	275
European exporters.	1,150	1,270	France	1,275	— ^c
U.S.S.R.	890	50	Other European		
Others	400	990	countries	5,200	3,670
World total	21,710	14,620	European total	16,670	10,180

^a From International Institute of Agriculture: "World Agricultural Situation in 1934/35" (Rome, 1936).
^b Net import of 180,000 metric tons.
^c Net export of 460,000 metric tons.

The above table shows that the restriction of imports has been particularly severe in Italy, Germany and France. Together, these three countries account for about 70% of the decline in world net exports between the two periods shown.

The effect, indeed the object, of Governmental intervention in the wheat trade is to ensure that the domestic producer obtains a higher price than that prevailing on world markets. The following table shows the recent changes in the price of wheat in four countries which normally export wheat and six countries which normally import it:

Table VI.

WHOLESALE PRICE OF WHEAT IN CENTS (GOLD PARITY)
PER BUSHEL OF 60 LB. (27.216 KG.)

January	Argentina	Exporting countries		United States of America
		Canada	Hungary	
1929	115.40	120.37	117.59	120.63
1930	123.63	129.51	115.49	122.00
1931	51.99	53.62	66.17	79.25
1932	43.64	51.26	63.31	57.51
1933	39.28	38.86	53.10	48.26
1934	33.03	38.18	27.78	55.67
1935	33.72	47.37	52.31	63.50
1936	54.99	50.00	52.47	68.93
1937	59.32	72.97	67.45	80.84

January	United Kingdom (Manitoba)	Italy	Importing countries		Switzerland ^a
			France	Germany	
1929	150.57	193.21	164.64	135.55	221.73 ^b
1930	152.62	194.79	146.05	159.50	221.55 ^b
1931	75.10	149.41	184.55	167.48	209.79 ^b
1932	66.96	150.00	178.51	147.47	201.75
1933	52.83	155.66	115.85	119.85	194.18
1934	51.73	123.31	132.71	120.63	189.38
1935	56.35	130.24	82.87	131.66	177.94
1936	62.23	145.90	90.17	132.45	178.73
1937	90.05	104.86	111.04	134.49	125.35

^a Price paid to the producer.
^b Yearly average.

The effect of high wheat prices in stimulating production in the protected markets is referred to below. Their effect on the quantity of bread consumed is probably not very great, but, on the other hand, the impact of high bread prices on general nutritional

levels must be considerable. The poorer sections of the working population of modern industrial communities may spend as much as 20% of their total food expenditure on bread or bread products. When the price of bread goes up, or when it is maintained at a relatively high level at a period when money incomes are falling, more of their income must be spent for this necessity of life and less is available for other foods. In these circumstances, their purchases of supplementary foods are likely to be restricted. In short, the demand for bread is inelastic, and a relative increase in its price is equivalent to a reduction in real income. The following chapter shows in detail how a reduction in income results in a decline in the consumption of the protective foods and deterioration of the diet. These effects of high wheat prices on bread-consumers must be weighed against their influence on the incomes and consumption of wheat-producers.

23. Since 1933, with the growth and spread of the desire for economic self-sufficiency, restrictions have been placed, not only on international movements of cereals for human consumption, but also on trade in fodder crops. In France, to take but one example, imports of maize amounted to 9.6 million quintals in 1932; a quota of 3.7 million quintals was imposed in 1933, and by 1935 this had been reduced to 2.1 millions. For oats, the 1935 quota was 25,000 quintals compared with imports of 1.2 millions in 1932; for barley, 195,000 compared with imports of 2.3 million quintals in 1932. Some of the principal changes in the world trade in maize are summarised below:

Table VII.

WORLD TRADE IN MAIZE, IN THOUSANDS OF METRIC TONS. ^a

	Net exports				Net imports		
	1926-1930	1931-1933	1934		1926-1930	1931-1933	1934
Argentine . . .	5,870	7,280	5,470	<i>Producing coun-</i>			
Danubian coun-				<i>tries</i>	2,800	2,970	1,950
tries ^b	1,440	1,830	1,360	Italy	660	510	160
United States. .	520	130	80	France	740	980	630
World total . .	9,010	10,490	8,470	Czechoslovakia.	300	390	210
				<i>Non-producing</i>			
				<i>countries</i>	5,750	7,150	6,030
				United Kingdom	1,790	2,660	3,120
				Netherlands . .	1,150	1,500	1,000
				Germany	1,080	510	390

^a International Institute of Agriculture, *loc. cit.*
^b Roumania, Yugoslavia, Bulgaria and Hungary.

Where imports have been restricted, the domestic price has, of course, risen above world levels. The nutritional significance of artificially high prices for fodder crops lies in the fact that these are a raw material of the animal husbandry industry; and when fodder prices are raised, this naturally tends to raise the price of milk, butter, meat and other valuable human foods. It is perhaps worth raising the question whether the protection of domestic production of cereals for human consumption could not by some means be prevented from increasing the cost of producing foods particularly valuable from the standpoint of nutrition.

24. Since 1930, the trade in butter in most countries has been severely curtailed through high import duties and quantitative restrictions. The German import duty on butter, which was RM 27.50 per 100 kg. before November 1930, was increased by stages to RM 75 per 100 kg.; the State exercises a monopoly of dairy marketing and there is a monopoly tax almost as high as the duty. Import quotas on butter are fixed from month to month. In France, the minimum duty on butter in the last quarter of 1936 was 728 francs per 100 kg.; quota restrictions have been in force since 1931 and there is a licence tax of 200 francs per 100 kg. Imports of butter into Belgium have been restricted by quota since 1932 (except for the period October 1935-March 1936); the duty is 161 francs per 100 kg. and the licence tax 750 francs per 100 kg. The general duty on imports of butter into Italy is 500 lire per 100 kg. In Switzerland, there is an import duty of 20-30 francs per 100 kg. *plus* a supplementary duty of 100 francs. A system of quotas has been in force since 1931 and there is an import monopoly.

Recent changes in the trade in butter are shown below:

Table VIII.

WORLD TRADE IN BUTTER, IN THOUSANDS OF METRIC TONS. ^a

	Net exports			Net imports	
	1926-1930	1934		1926-1930	1934
Denmark	150	150	United Kingdom .	305	485
New Zealand	75	130	Germany	120	60
Australia	40	110	Switzerland	8	0.3
Netherlands	45	35	Europe	439	563
Sweden	20	25			
World	475	590			

^a International Institute of Agriculture, *loc. cit.*

In spite of increased restrictions, the world trade in butter was higher in 1934 than in 1926-1930; but this was entirely due to greatly increased imports into the United Kingdom, where the sharp fall in butter prices led to a striking increase in consumption. Imports into Germany fell by half, and were also sharply reduced in most of the minor importing countries. Many butter-exporting States subsidised exports in this period by taxing the domestic consumer of butter or liquid milk. In this way, the price to the consumer was kept relatively high in certain of the exporting as well as in most of the importing States.

Table IX.

RETAIL PRICE OF BUTTER, OCTOBER 1936.
(In Swiss francs per kg.)

Exporting countries		Importing countries	
Estonia	1.89	Czechoslovakia	2.69
New Zealand	2.30	Belgium	3.05
Denmark ^a	2.61	United Kingdom	3.31
Australia	2.65	France	3.31
Sweden ^a	2.98	Switzerland	4.76
Netherlands	3.89	Germany	5.40

^a Salter butter.

It has been shown earlier, in Part III, Chapter 3 above, that the demand for butter is elastic and that consumption has increased markedly in countries where the price has been relatively low. The new science of nutrition attaches special importance to the consumption of milk and dairy products, and it is clear that the policy of heavy import duties in the importing countries and export bounties collected by a tax on domestic consumption in the exporting countries militates against the desired increase in consumption; the consumer pays at both ends. The question may be raised whether the sums spent in subsidising exports from certain countries could not, with greater profit—at least from the standpoint of nutrition—be spent in subsidising the domestic consumption of liquid milk and/or butter.

25. The effects of agricultural protection on agriculture itself are naturally different in the exporting and the importing countries. The restriction of the world market tends to depress the price and income which the producer in the exporting country obtains for his

product, and so to have a deleterious effect on his standard of nutrition. The consumer in the exporting country will (if there is no Government intervention designed to keep domestic prices above world levels) be able to obtain certain foods cheaper than would be the case if more of the total production could be sold abroad; and this fact will, other things being equal, tend to increase his consumption in cases where the demand is elastic. The recent increase in the consumption of butter in Denmark may be quoted as an example of this type of reaction. As already observed, however, certain exporting countries have taxed the domestic butter consumer in order to subsidise butter exports. The following table¹ shows the differences in March 1935 in the wholesale price of butter for domestic consumption in certain exporting countries and the price at which butter from the same countries was quoted on the London Provision Exchange:

Table X.

WHOLESALE PRICE OF BUTTER IN CERTAIN HOME MARKETS AND IN LONDON,
MARCH 1935.

(In Swiss francs per 100 kg.)

Country of origin	Average monthly quotation in home market	Average monthly quotation of London Provision Exchange for butter from country indicated
Argentina	80 ^a	107
Australia	160	105
Denmark	74	146
Netherlands	298	112

^a April.

The table makes it clear that the domestic consumer of butter in certain exporting countries has to some extent been subsidising consumption in the United Kingdom.

The demand for cereals, on the other hand, appears to be inelastic; and the sharp fall in domestic prices in certain export markets which took place in recent years—and which was partly cause and partly effect of the trade restrictions—led to no increase in the domestic consumption of cereals as a whole, so that there

¹ From C. M. WRIGHT: "Butter as a World Staple" in *Index* (Stockholm), November 1935.

was no direct nutritional gain to set off against the farmer's loss. Moreover, the income of the non-farming food-purchasing section of the community in countries exporting food is partly dependent on the ability to sell industrial goods to the domestic farming population; and the contraction of farm income which results from trade restrictions necessarily tends to reduce also the income of other sections of the population, and so to affect adversely their level of nutrition.

26. The effects of commercial policy on the quality of the nutrition of the protected agricultural population of food-importing countries are not easily determined. It has been shown above that the effect of trade restrictions is to keep food prices in the protected markets at relatively high levels, and it has been argued that this tends to limit the purchases of food-purchasers in these countries. Conversely, the high domestic prices mean that the income of the domestic farmers who sell the protected foods tends to be higher than would be the case if more foreign supplies were allowed in, and if they continued to produce these same products.

If, however, protection and high prices lead to so great an increase of domestic production that all domestic requirements are covered and there is a surplus available for export, the control of the domestic price will be endangered. The rapid fall in the price of wheat in France when an export surplus was produced in 1933 provides a good illustration of this danger. It is, of course, clear that the high domestic price increases the income of producers in the domestic market only in so far as they are producing for sale. Where production of the protected crops is on a subsistence basis, price is of much less importance, and certain types of agricultural protection may even tend to reduce the income of some sections of the agricultural commodity. For example, in many European States which have imposed severe restrictions on imports of grain crops, grain is sold chiefly by the farmers with relatively large estates. The small farmer generally produces grain only for his own requirements and sells chiefly animal crops. For him, the protection of grain crops may mean higher fodder prices—*i.e.*, higher raw-material costs.

It is therefore necessary, in considering the effects of particular trade restrictions on agricultural income and prosperity in the protected markets, to distinguish sharply between the interests of

the various sections of the agricultural population, which may at times be quite divergent. Moreover, it is also necessary to take into account the effect of these policies on the general level of economic prosperity, on which the fortunes of domestic agricultural systems are everywhere closely dependent. The maintenance of food prices at relatively high levels in industrial countries may have an injurious effect on the export trade by keeping labour costs high and reducing competitive capacity in international markets. Furthermore, the growth of industrial protection in the food-exporting States is the inevitable counterpart to the growth of agricultural protection in the food-importing States.

27. Through their influence on relative prices, tariffs and other trade restrictions make certain types of agricultural production more profitable than others, and producers consequently tend to concentrate, so far as natural conditions permit, on the more profitable lines. In this way, there is a tendency for unsuitable land to be brought under cultivation and for average yields to be reduced. An illustration is afforded by the recent history of wheat production in Europe. Figures have been quoted in Table VI above to show that since 1929 the tariffs imposed on wheat have kept its price relatively high in certain European markets. The extent to which producers have reacted to this situation is illustrated in the following table, showing the changes in the acreage under wheat in different parts of the world:

Table XI.

AREA HARVESTED TO WHEAT, IN MILLIONS OF HECTARES. ^a

	Average 1926-1930	1931	1932	1933	1934
Four great exporting countries ^b . . .	47.8	46.2	47.7	43.2	38.8
European importing countries . . .	19.6	20.3	20.9	21.6	21.6

^a From International Institute of Agriculture: "The World Agricultural Situation in 1934/35" (Rome, 1936), page 54.

^b Argentine, Australia, Canada and United States.

While the great exporting countries, where wheat is produced by mechanised low-cost methods, reduced their acreage by 9 million hectares, or nearly 20%, between 1926-1930 and 1934, the European importing countries increased theirs by 2 million hectares, or 10%. The significance of this shift in production from the standpoint

of nutrition has already been indicated. The increase in the area under wheat in the importing countries of Europe is also significant from the point of view of the adjustment of agriculture to the trends in consumption outlined in earlier chapters. As wheat prices have been kept relatively high, the economic inducement to go over to other cultures has been lessened, and this despite the fact that the trend of wheat consumption is down and the trend of consumption of certain other foods upwards. It is, of course, impossible to say what the structure of European agricultural systems would be if the protection given them were less or of a different character. Protection has been given, not only to the producers of cereals, but also, for example, to butter and meat producers. Domestic *production* of these latter foods has been stimulated, though possibly to the detriment of domestic consumption.

28. What, then, is the rôle of commercial policy in connection with nutrition? From the preceding analysis, it appears that any quota tariff, tax or trade restriction whose effect is to raise the price which the consumer must pay for *any* food (or even non-food) is likely to have an adverse effect on his nutritional standards. If the price of cereals (or other foods of high energy value) is raised, or kept high when incomes are falling, the consumption of cereals (or the other foods of high energy value) is not likely to be much affected, as the first desire of the consumer is to satisfy his hunger; and, even though bread prices are kept high, bread generally still remains the cheapest means of doing this. The consumer does not eat less bread, but he pays more for what he eats. This is equivalent to a reduction in his real income; and, as he is forced to curtail his expenditure on other foods, the consumer will (as is shown in detail in the next chapter) restrict his purchases of the higher-priced protective foods which are essential for health and efficiency.

If, on the other hand, commercial policy results in relatively high prices of the protective foods, the adverse effect on the amounts consumed is even more direct. In the first place, as in the case of cereals, the high prices mean a reduction in real income which is likely to be followed by a general redistribution of food expenditure in a way inimical to sound nutrition. Moreover, the demand for many of the protective foods has been shown to be elastic—*i.e.*, to change rapidly in proportion to changes in price. A rise in their price is likely, therefore, to result in a direct restriction

in their consumption and the substitution of cheaper and less nutritious foods. It has, for example, frequently been observed that, when the price of butter rises relatively to that of margarine, the consumption of butter falls and that of margarine increases.

29. The considerations of the preceding paragraph are confined to the influence of trade restrictions on the level of nutrition of the food-purchasing public. Important though these considerations are, they are not the only ones determining agricultural policy. Nor is it urged here that these considerations should necessarily be decisive in any concrete case: to give them sole weight would be to neglect the interests of food-producers and result in a radical transformation in the economic structure of certain States which, for social, political and military reasons, could not be undertaken. It is essential to balance the interest of the farmer, who is at once producer and consumer of foodstuffs, against those of other workers, who are consumers only. Moreover, liberty of international commercial transactions is necessarily bound up with the international mobility of capital and labour; it would seem clear that no considerable increase in the international movement of commodities can be expected without a corresponding increase in the international movement of the factors which produce them.

It cannot, however, be too strongly urged that, in framing their commercial and general economic policy, Governments should give due weight to these considerations of a nutritional order. If they have not always done so in the past, this is at least partly due to the fact that the importance of adequate nutrition as a factor influencing health and efficiency has not been fully realised. With the knowledge which has been gained in recent decades, it is now apparent that irreparable harm can be done through faulty diet; and it is to be hoped that this knowledge will influence Governments more than hitherto when they are contemplating measures whose effect will be to raise food prices to the consumer and so restrict his consumption. It is pleasant to be able to record that the knowledge of the importance of adequate nutrition has recently influenced the commercial policy of at least one country: in February 1937, the Estonian import duties on fruit were very substantially reduced. In introducing this measure, the Estonian Minister of Commerce explained that its purpose was to increase the consumption of fruit and so improve the nutrition of the Estonian people.

30. If considerations of nutrition are kept in mind, it may be possible to devise means which will assist national agricultural systems without exerting an adverse effect on consumption levels. The appropriate means will depend upon the circumstances of each particular case, and it is not possible to give concrete indications here. From the standpoint of nutrition, it would seem that measures for the expansion of consumption are preferable to measures which restrict imports or production. Through such measures (which may, in certain cases, involve subsidies to consumption collected through the general taxing power of the State) it may be found possible to encourage both the production and the consumption of protective foods. The structure of national agricultural systems may, through these means, be encouraged to develop along the lines on which consumption should change—with benefit both to producers and to consumers. Particular attention may be drawn to the possibility of the cheap or free distribution of certain foods to certain sections of the community—such, for example, as the distribution of milk to school children and expectant and nursing mothers. The possibilities with regard to milk are particularly important, as this is a food of unique nutritional value and one which cannot, in its nature, enter into international trade to any great extent. Here the interests of nutrition and national agricultural systems clearly coincide, and it would seem that greater use might be made of this fact by many countries in framing their agricultural policies. What is true of milk holds in only slightly less degree of certain other commodities, such as fresh fruit and vegetables. The methods of subsidising consumption present greater difficulties in these cases, but examples have been quoted above to show that, in certain cases, successful techniques have been devised. It is obviously impossible to make specific recommendations here; it is sufficient to express the opinion that the problem of devising methods which will assist domestic agricultural systems without harming nutritional levels is worthy of the most earnest consideration on the part of Governments.

D. PRICE AND PRODUCTION CONTROL.

31. Commercial policy is not the only instrument which has been used deliberately to control the supply and prices of foodstuffs.

Intervention by the State or by voluntary organisations of producers has been directed in several cases towards a deliberate restriction of production with a view to raising prices. In other cases, production has been stimulated by subsidies or other means in an attempt to increase self-sufficiency in foodstuffs. Finally, State intervention in regard to food prices has sometimes been undertaken to protect consumers against a rise in prices resulting from devaluation, or from scarcity due either to natural or to artificial causes.

32. Measures directed towards raising food prices by restriction of production have been undertaken mainly by exporting countries which have lost a considerable part of their export markets. Intervention in such cases is designed to assist the process normally brought about, after the lapse of time, by the forces of the market. These forces, which tend in other sections of the economy to eliminate unprofitable enterprises through the price and profit mechanism, are notoriously slow and ineffective in the sphere of agriculture. Farmers may continue to produce at a loss for many years, and even, in some cases, meet falling prices by an increase in output in the attempt to maintain gross receipts. The result is a further fall in prices, particularly where the normal outlets are artificially cut off by trade restrictions. In such cases, State action has been taken to bring about a reduction in output, in the hope that prices may be raised once more to remunerative levels.

An outstanding example of such measures was the agricultural adjustment programme introduced in the United States in 1933. Benefit payments and compensation were paid to producers who undertook to reduce the acreage of wheat and corn planted and the production of hogs; in addition, an emergency programme of purchasing sows and pigs for slaughter removed considerable supplies from the market. These measures, aided by a severe drought, led to a certain rise in prices. Following the rise in world prices and a succession of dry seasons, the measures introduced in 1936 after the Agricultural Adjustment Act had been declared unconstitutional laid more emphasis on diversification and balancing of production with a view to soil conservation than on restriction.

An extensive programme of production restriction was applied also in the Netherlands to meet the difficulties of marketing

agricultural commodities at remunerative prices, both abroad and in the home market. Thus, the area sown to wheat on any given farm was restricted to one-third of its arable land. Potato production was limited by the imposition of a fee of 30 florins per hectare for permission to cultivate. Cattle and hog production was reduced by the limitation of the number of calves and hogs allowed per farm, as well as by the purchasing of inferior cows and of hogs for slaughter and distribution to the unemployed. The hatching of eggs was allowed only by those with incubation permits. Production of vegetables and small fruits was compulsorily reduced by percentages varying from 10 to 75 according to the areas cultivated. Cheese production was, moreover, reduced by a voluntary agreement.

In Denmark, also, meat prices were raised by the buying-up and slaughtering of surplus cattle, and steps were taken to assist the reduction of pig production after the limitation of the British market through quotas.

These examples are sufficient to illustrate the type of State intervention which has been applied by exporting countries to the problem of agricultural surpluses arising mainly from the loss of export markets.

33. The measures of production control employed to improve the situation of farmers in importing countries serve a somewhat different purpose. They are generally employed in combination with import restrictions for the purpose of creating a relative scarcity in the domestic market: the control of prices due to tariff or quota regulations may become ineffective if it encourages too great a compensatory expansion of domestic production.

Some measures of output control in the United Kingdom may be classed under this head. The marketing scheme designed to increase the profitability of potato and hop production are based on the limitation of supply: in the case of potatoes, by fines on increased acreage and, in the case of hops, by prohibiting any increase beyond strict quotas, reinforced by the limitation of imports. For wheat, the full assistance secured under the Wheat Act (1932) has, up till 1937, been paid only on a limited output (27,000,000 cwt.). The milk and hog marketing schemes, on the other hand, have led to a considerable increase in production; in the case of milk, this has meant mainly an increase of milk sold

for manufacturing purposes, assisted by heavy subsidies and voluntary agreements limiting the imports of processed milks.

The policy in regard to wheat prices in France arose from a situation half-way between the two above considered. French wheat production normally covered about 75% of domestic requirements. A bumper crop in 1932/33 led to a surplus which threatened to produce a violent fall in prices. This was not considered as a permanent problem requiring acreage reduction, but an emergency calling for an immediate control of existing supplies. Two types of measures were applied: the purchase of wheat for purposes of denaturing¹ and export, and the development of storage facilities and a carry-over system, with a guaranteed minimum price. The latter method has been maintained as a means of evening out undue price fluctuations.

34. A further type of price control which has been applied for the benefit of farmers in some of the wheat-exporting countries in Eastern Europe is that of a monopoly organisation employing discriminating prices in the home market and for export. Thus, the Central Grain Purchasing Bureau in Bulgaria buys and sells grain in the domestic market at high fixed prices and exports at world parity prices. A similar policy is carried out by the Privileged Export Company in Yugoslavia.

35. Another measure employed for the benefit of wheat farmers in a number of countries is the compulsion of domestic millers to employ a given proportion of domestically produced wheat, thus increasing its market and normally tending to raise the price of bread.

36. In the later stages of the production of foodstuffs, price-raising measures are more frequently the result of voluntary monopolistic organisations of processors or retailers for the purpose of fixing minimum prices. The attitude of the State towards such policies is generally less sympathetic than in the case of the primary producers; this is partly due to the fact that agricultural production is being encouraged in many countries as part of a national policy of self-sufficiency or for other social or economic reasons, and partly

¹ *I.e.*, rendering unfit for human consumption.

because the conditions of processing and retailing are more mobile and susceptible to the working of market forces, and therefore require less State assistance, than in the case of primary production. In some countries, however, an attempt has been made to improve the situation of retailers by a limitation of their number through licensing systems.

37. Finally, mention must be made of intervention applied to the price system for the benefit of consumers. Such intervention has, on the whole, been less frequent than measures designed to raise prices to the producer. Recent examples are, however, afforded by the steps taken in certain countries—for example, Belgium, Czechoslovakia and France—to prevent currency devaluation from resulting in speculation in food and an unwarranted rise in the cost of living.

Germany probably offers at present the most extreme example of food-price regulation outside the Soviet system. Prices are there fixed both with a view to encouraging production by improving the returns to producers and, at the same time, for the purpose of protecting consumers from the effects of the relative scarcity resulting from increased monetary demand and the drastic exclusion of imports. Thus minimum prices are established for the sake of producers and maximum prices combined in some cases with rationing, both for the benefit of consumers and as a means of directing consumers' choices in accordance with the general economic programme. The result has been a severe cutting-down of margins earned by intermediaries between the primary producer and the ultimate consumer.

38. The above examples serve to indicate the high degree to which prices may be affected by State intervention or by monopolistic organisation of the market. It would be out of place to enter here into the merits and demerits of such interventions in particular cases. It is important, however, to emphasise, from the point of view of nutrition policy, that a powerful weapon for the influencing of nutrition standards lies at the disposal of Governments in the form of price and production control, and that, whenever this weapon is called into action for one purpose or another, the interests of nutrition should be given particular weight.

E. DISTRIBUTION COSTS.

39. The last link in the chain leading from producer to consumer is the distribution stage. The costs of distribution are periodically—particularly during the depression phase of the business cycle—subject to attacks from the side both of consumers and of producers. The producer calls for a reduction in distributors' margins as a means of raising the price obtained for his produce, while the consumer hopes thereby to reduce the prices which he has to pay at retail.

40. In recent decades, there has been a notable increase in most countries in the proportion of the population engaged in distribution. This is no doubt to be explained largely by the extension of the services supplied by distribution—more rapid and frequent delivery, improved packing, etc.; it may be due in part, however, to the fact that the recent striking rise in productivity per head which has characterised most branches of production has not been accompanied by a corresponding movement in all branches of distribution.

41. Interesting data comparing the changes in efficiency of production and distribution in German consumers' co-operative societies are given by the Central Union of Consumers' Co-operative Societies.¹

Table XII.

VALUE OF SALES PER PERSON ENGAGED IN DISTRIBUTION
OR PRODUCTION.

Year	Distribution RM.	Production RM.
1903	23,778	14,121
1904	22,771	12,277
1909	23,761	16,055
1914	19,427	23,027
1925	19,849	25,607
1926	22,660	28,390
1927	24,403	30,987
1928	25,285	36,199
1929	26,812	37,836
1930	28,143	41,340
1931	28,572	40,182

¹ *Year-Book*, 1932.

42. The United States Department of Agriculture has recently published figures ¹ showing the estimated retail value and equivalent farm value of quantities of fifty-eight foods purchased annually by a typical American working-man's family:

Table XIII.

FARM AND RETAIL VALUE OF TYPICAL FOOD SELECTION IN U.S.A.

Year	Farm value \$	Retail value \$	Margin		United States earnings per hour of wage-earners (1926 = 100)
			\$	% of farm value	
1913	134	252	118	88	44
1920	272	514	242	89	102
1922	170	374	204	120	91
1929	195	415	220	113	102
1932	88	270	182	207	81
1936	150	345	195	130	91

43. Various enquiries, official and unofficial, have been made into the costs of distribution generally with a view to determining whether these costs are excessive.

The National Economic Council in France reported in 1933 on the distribution of foodstuffs in the following terms:

" 1. Our internal prices are high: the considerable fall in the costs of production during the years 1931 and 1932 was not followed in every case by a corresponding fall in wholesale prices, nor, in particular, in retail prices.

" 2. For certain commodities, the selling-price has been burdened by costs disproportionate to the value of the product; the excessive number of middlemen and distributors reduces the profits for each one, and obliges them to distribute their costs over too small a volume of sales.

" 3. The margin of profit gained by the middlemen varies considerably from one product to another. The National Economic Council was unable to find reasons to justify these substantial differences in percentages.

" The National Economic Council was unanimous in recognising the inadequacy of the organisation of the distribution of foodstuffs." ²

The Linlithgow Committee, which reported in 1923 on the marketing of milk, fruit, vegetables, meat, poultry and eggs in the United Kingdom, concluded that the cost of distribution of

¹ See U.S. Department of Agriculture, Bureau of Agricultural Economics: "Looking Ahead on Agricultural Policy" (Washington, December 1936).

² Conseil National Economique: "La Répartition des Denrées alimentaires". (Paris, 1933.)

these commodities was too high. "Taken as a whole, distributive costs are a far heavier burden than society will permanently consent to bear". The Geddes Committee, which reported in 1925, found that margins had been reduced and that the average profits were not excessive in the meat trade, though somewhat high in the retail baking industry.¹

44. Both the absolute and relative costs of distribution have shown everywhere a marked increase; caution must, however, be exercised in drawing conclusions regarding the scope for reducing distribution costs from a study of the nominal margins between producers' and consumers' prices. In the first place, the increase in distribution costs can be explained to a considerable extent by the extension of the services expected of and provided by distributors. Consumers have become more particular; the standards of quality and service demanded from distributors have been raised. The conditions of production and distribution of foodstuffs are expected to reach a higher level of cleanliness, and human handling of foods has to be reduced to a minimum; the premises where food is retailed to the public have become more hygienic, and at the same time more elegant and luxurious. The goods are frequently delivered standardised and packed, so that the consumer can be sure that he is obtaining food of a uniform quality and weight. In the case of many staple foodstuffs—bread, milk, meat, etc.—he is no longer content to fetch them from the market or retail store, but expects them to be delivered to his door, once or even twice a day. All these improved services necessarily involve increased costs.

Although many of these developments have been of undoubted benefit to the consumer, there has, at the same time, been an unfortunate tendency in some countries for the over-development of standardisation and elaborate packing to deprive poorer people of access to plain but wholesome products. The demand on the part of many consumers for cheaper goods with less distributive services has led to the extensive development in some of these countries of cash-and-carry food stores.

45. In a recent study² of the costs of milk distribution in

¹ First Report of the Royal Commission on Food Prices, Vol. I, 1925.

² R. B. FORRESTER: "Milk Price Margins". Empire Marketing Board, 51. (London, 1932.)

several cities, the author found that the size of the margin was clearly related to the quality of the product and the service provided. The absolute margins between prices received by producer and paid by consumer are shown below:

Table XIV.

MILK MARGINS IN VARIOUS CITIES.
(In pence per imperial gallon.)

London	$11\frac{2}{3}$ - $11\frac{3}{4}$
Glasgow	$9\frac{1}{8}$ - $10\frac{5}{6}$
Berlin	$6\frac{1}{4}$
Hamburg	6
Copenhagen	9-10
Paris and suburbs	$5-5\frac{1}{2}$
New York	$18\frac{1}{2}$
Chicago	19

The high margins in New York and Chicago were found to correspond to high-quality hygienic and delivery services, 3.5% normal butter-fat content, compulsory pasteurisation and universal free delivery in bottle containers. The next group—London, Glasgow and Copenhagen—was stated to provide the best standards of hygiene and delivery among the European cities represented. The low margins in Berlin, Hamburg and Paris were stated to correspond to a lower degree of hygienic preparation, lower butter-fat content and delivery in bottle containers only on payment of an extra charge. The above rough correlation between quality and cost is not intended to suggest that economies in the distributive processes cannot be achieved; it is merely intended as a warning against the use of absolute margins as an index of the scope for such economies.

46. In a study on the distribution of certain fruits in France, the author remarks: "The margin which surprises the uninitiated causes much less astonishment to anyone who considers the numerous processes to which the product is subjected. Economic functions are not imposed by the will of men, but by the nature of things; and every stage of preparation inevitably involves costs."¹

¹ André BÉRARD: "Du Producteur au Consommateur".

47. Not only are the so-called margins frequently to be regarded rather as payments for special services, but, in addition, it must be remembered that the size of the margin is necessarily dependent on the rate of turnover and the value of the product. Many of the costs of distribution are fixed, and, if sales shrink rapidly as during a depression, these costs have to be spread over a smaller volume of sales, so that the unit burden is necessarily increased.

48. The following table shows the movements of farm prices and margins on retailing, processing, wholesaling and live-stock marketing of all meats in the United States in the years 1925, 1930 and 1934:

Table XV.

VALUES AND MARGINS OF ALL MEATS IN THE UNITED STATES. ^a

	1925		1930		1934	
	Cents	%	Cents	%	Cents	%
Value at retail.	24.6	100	23.7	100	17.2	100
Margin for retailing	5.2	22	5.6	24	5.2	30
Value at wholesale	19.4	78	18.1	76	12.0	70
Margin for wholesaling	1.1	4	1.0	4	1.0	6
Value at plant.	18.3	74	17.1	72	11.0	64
Margin for processing	3.7	15	3.7	15	3.94	23 ^b
Market value of live-stock	14.6	59	13.4	57	7.1	41
Margin for live-stock marketing	1.0	4	0.9	4	0.9	5
Farm value of live-stock	13.6	55	12.5	53	6.2	36

^a Bernard TOBIN: "What becomes of the Consumers' Meat Dollar?" Chicago, 1936.

^b Includes processing tax 1.4 cents = 3½% of retail value.

Even before the rapid fall in the price of live-stock, the farmer received only slightly more than half of the consumer's meat dollar. During the economic depression, when the farm value of live-stock fell violently, the various margins also fell absolutely but very much less rapidly, so that their share in the consumer's meat dollar was much increased.

49. The organisation of distribution varies so widely from country to country and from industry to industry that it would not be possible to make statements or recommendations in regard to distribution costs which could lay claim to general validity. The number of middlemen required to accomplish the transfer of products from the primary producer to the ultimate consumer

varies with the size and density of the population, with the nature of processing and the retailing and delivery services provided, with available transport facilities and with other locally differentiated factors. Moreover, credit facilities and such systems as that of retailing by mail order are developed to very different degrees in different countries. For reasons of this kind, it is possible here only to indicate in quite general terms the directions along which improvements in the organisation of distribution appear to have taken place and to be still possible in a number of countries.

In general, certain stages of distribution appear to offer considerable scope for economies of large scale. The saving on transport and handling costs resulting from centralisation of distribution over large areas, even if not over whole national markets, can be seen in the relative economy and success of co-operative and State schemes for the marketing and distribution of agricultural products and foodstuffs. Economies have been effected in this way also in the holding of stocks at various stages, in the elimination of wasteful competitive advertising, in rents for warehouses, processing plants and retail premises, and in costs of collection and delivery.

The contribution of producers' and consumers' co-operative organisations to nutrition policy through the reduction of marketing and distribution costs, and the consequent increase of farmers' and consumers' purchasing power, has been described in the report on "Workers' Nutrition and Social Policy" of the International Labour Office.¹

" In one form or another, the object is always to increase the consuming capacity of the members.

" This result is achieved by the co-operative organisations in two different ways: they either try to reduce the cost of the economic services they render to a minimum, or they make the price demanded for these services coincide as closely as possible with their actual cost free from all superfluous charges.

" To reduce the cost of their services, the federal structure of the organisations enables them and the small economic units of which they are composed to benefit by financial, administrative and technical concentration in the same way as any large undertaking. In addition, they can make use of other methods that are special to the co-operative movement.

" The most usual, and in any case the most obvious, means by which the price charged for the services rendered is made to coincide with the actual cost is the

¹ *Op. cit.*, Chapter VII, Section 4.

refund of 'surpluses' in whatever form this may take. This method, in effect, confers additional purchasing power on the members of the distributive societies. . .

"The savings effected by the agricultural co-operative societies in their marketing activities result in higher prices for the products of the farmers belonging to the societies. Thus farmers, who, it should be remembered, are also consumers, find their earnings increased and are able to get nearer to the best level of nutrition."

The co-operative organisations have tended, moreover, to reduce, by competition, distribution costs and consumers' prices in other sections of the economy. In some countries, they have been particularly effective in combating the influence of monopolies and cartels on retail prices of important foodstuffs.¹

In the case of large-scale non-co-operative enterprises, there is a danger that the considerable scope for economies of distribution may be counterbalanced by monopolistic exploitation. A large-scale centralised distributing organisation may be in a position both to drive a hard bargain with the primary producer, who is forced to get rid of his produce at any price offered, and at the same time to charge high prices to the consumers unchecked by the undercutting of competitors. In the case of such organised distribution, control may be necessary to secure that the economies of large scale are enjoyed by producers and consumers, and not merely used to build up monopoly profits for the distributor.

The fact that wages and salaries normally constitute the largest single element in distribution costs suggests that considerable scope for cost reduction may be offered by labour-saving devices such as mechanisation, or the elimination of handling processes. Mechanisation normally calls for considerable capital investment which is usually worth while only where distribution is organised on a large scale. The fact that mechanisation has been applied less in the distributive than in the productive sections of the economy may be largely due to the persistence of relatively small units in the former.

A reduction of the number of processes, the familiar "elimination of middlemen", has been effected in some cases by the establishment of large central markets where producer and consumer (or retailer) can meet and themselves perform some of the services usually supplied by middlemen. In many centres on the Continent,

¹ Cf. H. STOLPE: "Co-operation and Monopolies in Sweden", *International Labour Review*, July 1928.

distribution of foodstuffs at retail takes place several times in the week in market-halls or open market-places at prices substantially lower than those charged in retail shops. This procedure clearly eliminates or reduces considerably such costs as rent, transport, handling, packing, etc. Other efforts which have been applied in the same direction include retailing and delivery by producers, and, at the retailing end, non-credit retail stores, which eliminate credit costs and bad debts, and where, in some cases, a certain amount of self-service in the shop and the transport to his home are performed by the purchaser himself.

A high proportion of the margin of distribution is necessarily due to transport costs. These have, in some cases, been improved by efficiency of packing and loading, which economises space, and also by large-scale organisation, which has eliminated duplication and the carrying of goods over unnecessary distances between producer and consumer.

Another important cost element consists of rents. The concentration of stocks and the reduction in the number of retail stores have, in some countries, contributed to the cutting-down of this element. On the other hand, it has sometimes been found desirable to increase stocks of commodities of which the supply is irregular, in order to stabilise prices both to producers and consumers and thereby to reduce the cost of the risk factor.

Finally, particular attention is being paid to the problem of waste; attempts are made to reduce waste through the immediate elimination of spoilt goods, through increased use of refrigeration and cooling during storage, transport and retailing, and through better distribution of shipments as to both time and place.

In the United States and in some other countries, methods of intensive market research have been developed with a view to forecasting local demand, so as to avoid the shipment of goods to a market where remunerative sales cannot be assured.

50. It has been possible here to mention only a few of the points at which efforts for reducing distribution costs are being applied. The problem calls for detailed investigation in particular countries and industries. One of the essential conditions for such investigations is clearly the development of more exact cost-accounting by those engaged in distribution. In this connection, the promotion of the collection of distribution-cost statistics by the Economic Institute

for Small Traders in the Netherlands may be mentioned as a successful attempt to deal with this problem.¹

51. A particularly important field calling for improved methods of distribution is offered by the milk trade. A plentiful, regular, cheap and hygienic milk supply is one of the main essentials of satisfactory nutrition. A special problem arises from the fact that production is subject to greater seasonal fluctuations than consumption, yielding a summer "surplus" of milk which has to be disposed of outside the liquid market, and consequently at lower prices; organisation of the liquid-milk market is therefore bound up with that of various milk products. The complex problem of milk distribution seems to call for regional or national organisation.

52. It is clear that an improvement in the efficiency of the distribution of foodstuffs must be a primary element in nutrition policy. Certain steps have already been taken in the establishment of consumers' committees and the periodic setting-up of Government commissions of enquiry to give special consideration to consumers' interests in connection with distribution. Too often, unfortunately, action has stopped short at this point. Anomalies have been pointed out, excessive margins discovered, and suggestions made for improved organisation; it is essential that these preliminary analyses of the defects of the existing system should be followed by an active policy of reform and reorganisation.

¹ Cf. F. L. VAN MUISWINKEL: "Distribution Cost Statistics for the Retailer". International Congress for Scientific Management, London, 1935.

Chapter 5.

THE RELATION OF INCOME TO NUTRITION.

1. In the two preceding chapters, an attempt was made to indicate the relationship between prices and consumption and to analyse the factors determining the price of food to the consumer. The quality of nutrition, however, depends upon the amount of money available for food in relation to food prices, and the wisdom and intelligence with which it is spent. The present chapter and that which follows will accordingly be devoted to an analysis of the rôles of income and education in determining nutritional levels.

2. The data on which the following analysis is based refer almost exclusively to urban populations. This is due not to an under-estimation of the importance of the problem of the nutrition of agriculturists, but to the less dominant rôle played by money income in determining farmers' consumption, owing to the production of food for family consumption on the farm. The following figures relating to three Canadian provinces illustrate the importance of this factor even in a country where farming is conducted largely on a market and not a subsistence basis:

Table I.

PERCENTAGE VALUES OF LEADING FOOD GROUPS PRODUCED ON THE FARM AND PURCHASED, 1934.^a

	Alberta (523 households)		Ontario (512 households)		Saskatchewan (639 households)	
	Produced on farm	Purchased	Produced on farm	Purchased	Produced on farm	Purchased
Meats	87	13	72	28	91	9
Butter and cheese	89	11	64	36	90	10
Flour	43	57	21	79	27	73
Canned goods . .	10	90	21	79	6	94

^a British Commonwealth Scientific Conference, Canadian Preparatory Committee: Report of the Subcommittee on Nutrition. Ottawa, August 1936.

An analysis of the problem of the nutrition of farm families is confronted by particular difficulties owing to the scarcity of records

of the home consumption of foods produced on the farm. At the same time, it is along the lines of such production for family consumption, and its guidance in accordance with the directives furnished by nutritional science, that the most hopeful approach to the problem of the nutrition of farm families lies.

3. To ascertain the rôle of income in determining nutrition, two main types of investigations may be employed. First, by examining data on family living classified according to income classes the changes in consumption which accompany changes in income may be ascertained and the nutritional implications of those changes examined. Secondly, the cost of minimum adequate diets which have been laid down by nutrition authorities may be compared with the sums available for expenditure on food in various classes of the community and with the allowances available for food by those in receipt of relief assistance.

A. RELATION OF INCOME TO FOOD EXPENDITURE.

4. It is an almost universal rule of experience that, in the family of the average worker, the total sum spent on food increases with total income. This may be illustrated by the following figures from the family expenditure studies in Poland (1928) and in Belgium (1928/29).

Table II.

FOOD EXPENDITURE AND TOTAL INCOME.

<i>Poland.^a</i>		<i>Belgium.^b</i>	
Income	Average expenditure on food	Income	Average expenditure on food
Zloty	Per consumption unit ^c	Francs	Per quet ^c
	Zloty		Francs
599 and below	345	Under 200	126
600-899	452	200-300	169
900-1,199	465	300-400	201
1,200 and over	712	400 and over	225

^a *Statystyka Polski*, Tome XL, zeszyt 1. Warszawa, 1930.

^b Armand JULIN: "Résultats principaux d'une enquête sur les budgets d'ouvriers et d'employés en Belgique (1928/29)", *Bull. de l'Institut international de Statistique*, XXVIII, 1934.

^c The consumption unit is a device for rendering comparable observations from families of different types —*i.e.*, different size, age and sex composition. A scale of relative consumption requirements of individuals of different ages and sexes is used to convert the data obtained from the original observations relating to

[Continued on following page.

5. Expenditure on food is influenced, not only by the limitations of total income, but also by habits, tastes and conventional standards of living, which again vary with occupation, degree of urbanisation and family type. In general, wage-earners spend a larger proportion of their income on food, and less on "keeping up appearances", clothes, rent, furniture, etc., than do clerical or professional families receiving similar incomes. The influence of the type of employment on the proportion of total expenditure devoted to food can be seen in Diagram I on page 245, which shows the sums spent on food by different general occupational groups having the same income per "consumption unit".¹

Wage-earners generally pay less rent than clerical and professional families with the same income. In a German enquiry (1927/28), it was found that wage-earners generally lived in smaller apartments than professional families, although the quality, as measured by the proportion of rent to floor or air space, was about the same in different occupational groups with the same incomes. The importance of rents in determining the amount of income available for food has frequently been emphasised. In Stockton-on-Tees, England, it was found that workers' families which were transferred from slum dwellings to a modern housing estate suffered seriously in health as compared with those who remained in the slums, owing to the necessity for paying a larger proportion of their incomes for

[Continuation of footnote from preceding page.]

different families into comparable units. For example, in scale (a) below, the consumption requirements of a child aged 5 are taken as equal to half the requirements of a grown man.

In practice, a number of different scales of requirements have been used, but most of them have been based on calorie requirements only. In fact, however, the relative requirements of the various nutrients do not bear a fixed proportion to the requirements of calories throughout all ages or for both sexes. The application of a calorie requirement scale to the intake of proteins, minerals and vitamins and of specific foodstuffs, or for the purpose of classification into income groups, has therefore a distorting effect on the results. Exact scales of requirements for various nutrients have not yet been internationally agreed upon; the degree of distortion can, however, be gauged to some extent from the table given in footnote a on page 253 which indicates the differences between the relative requirement scales used by the U.S. Bureau of Home Economics, for calories, for various minerals and vitamins and for the cost of adequate diets generally. Unfortunately, most studies on family living from which the illustrative matter of this chapter is drawn suffer from the distorting effects of applying calorie requirement scales only; it has been necessary to make use of this material in default of better. The question of establishing scales of relative requirements for various nutrients is at present being studied by the Technical Commission on Nutrition of the Health Organisation of the League of Nations, and it is to be hoped that future family living studies will be able to take advantage of the work of that Commission.

In the material quoted in this chapter, a number of different scales of relative calorie requirements have been used. A reference table of these different scales is given below; in subsequent examples, the particular scale used is always indicated. In Table II above, the scale used for the Polish data is (a), and that of the Belgian data (b). In the latter, a "quet" represents the requirements of a child under 1 year.

[Continued on following page.]

¹ The scales *c* and *d* respectively are employed for conversion into consumption units in the data for Czechoslovakia and Sweden. For the German data, scale *f* is used for food consumption, and an average of *f* and *g* (non-food requirements) for income.

rent, and in consequence not having enough available for an adequate diet.¹

The effects of rent restriction (*Mieterschutz*) on total food expenditure can be seen from the table on the next page, taken from a Czechoslovak enquiry into family living (1929/30).²

[Continuation of footnote from preceding page.]

On the question of the degree of difference involved in the use of different calorie scales, see International Labour Office: "Workers' Nutrition and Social Policy", page 41.

VARIOUS SCALES USED FOR CONSUMPTION UNITS.

Age Years	^a		^b		^c		^d		^e		^f	
	Male	Female	M	F	M	F	M	F	M	F	M	F
0 ..		0.25		1.0		0.1		0.15		0.43		0.50
1 ..		0.25		1.1		0.1		0.15		0.43		0.50
2 ..		0.40		1.2-1.5		0.1		0.15		0.43		0.50
3 ..		0.50		1.2-1.5		0.1		0.15		0.43		0.50
4 ..		0.50		1.2-1.5		0.2		0.40		0.43		0.50
5 ..		0.50		1.2-1.5		0.2		0.40		0.43		0.50
6 ..		0.50		1.6-1.9		0.2		0.40		0.43		0.50
7 ..		0.50		1.6-1.9		0.3		0.75		0.80		0.50
8 ..		0.60		1.6-1.9		0.3		0.75		0.80		0.50
9 ..		0.60		1.6-1.9		0.3		0.75		0.80		0.50
10 ..		0.60		2.0-2.3		0.4		0.75		0.80		0.75
11 ..		0.60		2.0-2.3		0.4		0.90		0.80		0.75
12 ..		0.70		2.0-2.3		0.4		0.90		0.80		0.75
13 ..		0.70		2.0-2.3		0.5		0.90		0.80		0.75
14 ..	0.85	0.75	2.4-2.6	2.4-2.6	0.5		0.90		0.80		0.75	
15 ..	0.85	0.75	2.4-2.6	2.4-2.6	0.7	0.6	1.0	0.90	0.95		1.00	0.90
16 ..	0.85	0.75	3.5	2.4-2.6	0.7	0.6	1.0	0.90	0.95		1.00	0.90
adult												
17 ..	0.85	0.75	3.5	3.0	0.9	0.7	1.0	0.90	1.00	0.90	1.00	0.90
18 ..	1.00	0.85	3.5	3.0	0.9	0.7	1.0	0.90	1.00	0.90	1.00	0.90
19 ..	1.00	0.85	3.5	3.0	1.0	0.8	1.0	0.90	1.00	0.90	1.00	0.90
20 ..	1.00	0.85	3.5	3.0	1.0	0.8	1.0	0.90	1.00	0.90	1.00	0.90
g												
Age	M		M		M		M		M		M	
Years		F		F		F		F		F		F
0 ..		0.20		0.47		0.20		0.15		0.2		
1 ..		0.20		0.47		0.25		0.20		0.2		
2 ..		0.20		0.54		0.30		0.30		0.3		
3 ..		0.20		0.59		0.35		0.35		0.3		
4 ..		0.20		0.59		0.45		0.40		0.4		
5 ..		0.20		0.59		0.50		0.45		0.4		
6 ..		0.30		0.60		0.53		0.50		0.5		
7 ..		0.30		0.60		0.57		0.55		0.5		
8 ..		0.30		0.71		0.60		0.60		0.6		
9 ..		0.30		0.71		0.63		0.65		0.6		
10 ..		0.50		0.80		0.66		0.70		0.7		
11 ..		0.50		0.80		0.70		0.75		0.7		
12 ..		0.50		0.90		0.73		0.80		0.8		
13 ..		0.50		0.90		0.76		0.85		0.8		
14 ..		0.50	1.00	0.83	0.80		0.90		1.0	0.8		
15 ..		0.70	1.00	0.83	0.83	0.80	1.00	0.90	1.0	0.8		
16 ..		0.70	1.00	0.83	0.86	0.80	1.00	0.90	1.0	0.8		
17 ..		0.70	1.00	0.83	0.89	0.80	1.00	0.90	1.0	0.8		
18 ..		0.70	1.00	0.83	0.93	0.83	1.00	0.90	1.0	0.8		
19 ..		0.70	1.00	0.83	0.96	0.86	1.00	0.90	1.0	0.8		
20 ..	1.00	0.90	1.00	0.83	1.00	0.86	1.00	0.90	1.0	0.8		
Over 60 ..												0.8

¹ MCGONIGLE and KIRBY, "Poverty and Public Health" (London, 1936).

² *Mitteilungen des Statistischen Staatsamtes der Tschechoslowakischen Republik*, 1934, Nos. 31-34.

Table III.

THE EFFECTS OF RENT RESTRICTION ON FOOD EXPENDITURE (CZECHOSLOVAKIA).

Incomes	Percentage expenditure on food:					
	Workers		Salaried employees		Officials	
	With rent restriction	Without rent restriction	With rent restriction	Without rent restriction	With rent restriction	Without rent restriction
Kr.						
Under 16,000 . . .	61	53	54	52	55	48
16,001-30,000 . . .	55	51	50	45	44	40
30,001-60,000 . . .	50	50	57	41	38	36
Over 60,000 . . .					22	22

A somewhat similar investigation relating to German workers in the textile, brewing and metal industries was made in 1931.¹ This investigation showed that the level of consumption of the inhabitants of new houses was more adversely affected by the depression than that of the inhabitants of old houses. Moreover, scarcity of old dwellings prevented the return of workers from new to old apartments as a result of falling income.

The following table relating to these groups of workers in Germany shows the movement of the "real income available for consumption" (*i.e.*, earnings minus wage tax, insurance premiums and rent) as compared with 1913 (= 100):

Table IV.

INCOME AVAILABLE FOR CONSUMPTION BY INHABITANTS OF OLD AND NEW HOUSES (GERMANY).

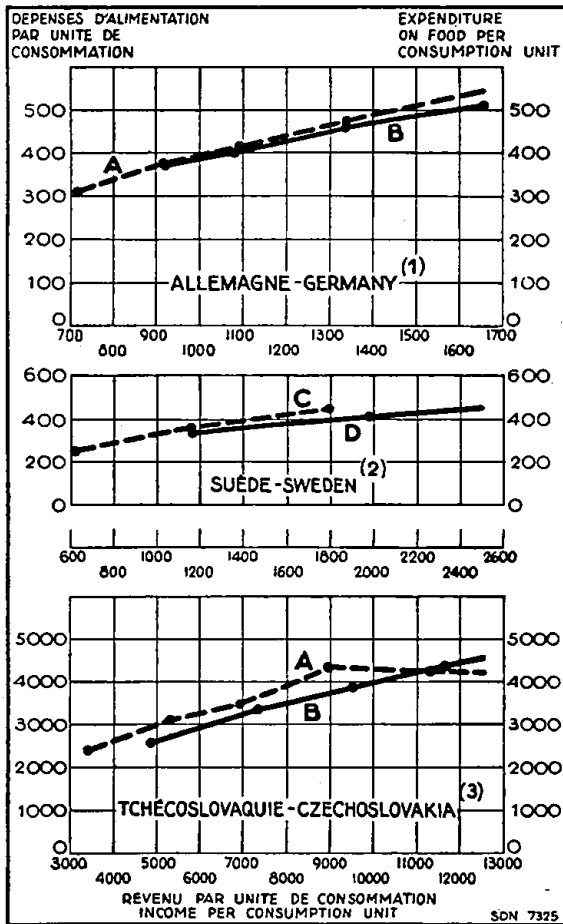
	1930		May 1931	
	Old houses	New houses	Old houses	New houses
	(September)			
Textile industry (1913 = 100):				
Skilled workers (male)	100	81	97	77
Assistants (male)	103	84	93	74
	(1930)			
Brewing industry (1913/14 = 100):				
Brewers	101	82	105	82
Drivers	117	95	120	95
Assistants	116	94	118	91
	(October)			
Metal industry (1913/14 = 100):				
Skilled workers	88	71	85	68
Semi-skilled workers	91	75	89	71
Assistants	93	74	91	72

¹ By Dr. Franz FÜRTH. See *Wirtschaftskurve*, Heft III, 1931.

Diagram I.

AMOUNTS SPENT ON FOOD BY DIFFERENT OCCUPATIONAL AND INCOME GROUPS.

- A Workers.
- B Officials.
- C Workers and lower officials.
- D Middle-class families.



(1) *Einzelchriften zur Statistik des Deutschen Reiches*, No. 22.

(2) *Sociala Meddelanden*, No. 12, 1934.

(3) *Mitteilungen des Statistischen Staatsamtes der Tschechoslowakischen Republik*, 1931, Nos. 43-44.

It is evident from the examples given in this paragraph that a policy directed towards improving nutrition standards must at the same time take into account other essentials of livelihood.

There are in every community certain generally accepted norms of consumption in respect of housing, clothing, recreation, etc., as well as in respect of food. Although it might be theoretically possible to attempt to raise one of these norms at the expense of the others, it would be difficult and, in most cases, undesirable to do so. Adequate shelter, clothing and recreation are also essential for well-being and health. It would therefore appear that the more hopeful approach is that of attempting to raise the absolute amount of incomes and to secure a more nutritionally desirable distribution of food expenditures.

6. Owing to differences in local prices, taxation levels, etc., the sums available for expenditure on food out of identical incomes tend to vary as between different localities, and particularly as between urban and rural areas.

7. Apart from these various external influences—of occupation and community interests, the level of rents, the size of towns, etc.—there is a general tendency governing the relation between income and food expenditure: as income rises, the absolute sum spent on food increases, but the percentage of income so spent falls. Bearing in mind the reservations regarding the external influences indicated above, a lower proportionate expenditure on food can normally be regarded as a symptom of a higher plane of living, both for consumers and, to some extent, for the economy as a whole.

B. RELATION OF TOTAL FOOD EXPENDITURE TO NUTRITION.

8. The influence of total food expenditure on nutrition is a double one: improvements both in the quantity and quality of diet generally accompany a higher outlay on food.

9. The purely quantitative aspect may be seen from the following examples:

Table V.

THE RELATION OF INCOME TO CALORIES, PROTEIN AND FAT CONSUMPTION.

Sweden. ^a

Workers and lower officials:

Income per consumption unit Kr.	Daily consumption per consumption unit ^b		
	Calories	Proteins Grammes	Fats Grammes
Below 700.	3,120	85	112
700-1,450	3,480	95	134
1,450 and over	3,840	104	152

Germany. ^c

Workers:

Annual income per consumption unit RM	Daily consumption per consumption unit ^d	
	Calories	Proteins Grammes
Under 800	2,530	69
800-1,000	2,771	77
1,000-1,200	2,858	82
1,200-1,500	2,966	87
1,500 and over	3,193	95

United Kingdom. ^e

Income per head per week Shillings	Daily consumption per head of		
	Calories	Proteins Grammes	Fats Grammes
Up to 10	2,317	63	72
10-15	2,768	76	99
15-20	2,962	84	110
20-30	3,119	89	121
30-45	3,249	94	131
Over 45.	3,326	98	142

^a *Sociala Meddelanden*, 1935, No. 3 (610 families).

^b Scale *d*.

^c *Einzelschriften zur Statistik des Deutschen Reiches*, No. 22, Teil I, page 95.

^d Scale *f* for consumption and average of *f* and *g* for income.

^e Estimates given in "Food, Health and Income", by Sir John Boyd ORR, page 34.

10. The improvement in the quality of diet which usually accompanies an increase in total food expenditure is to be explained by the fact that the more nutritive or protective foods are almost always more expensive as sources of energy than foods of less nutritive value. The first consideration must necessarily be to secure a minimum quatum of calories, at least sufficient to still the pangs of hunger. Where income is restricted, this quatum of calories will be obtained from the cheapest available sources; and this, unfortunately, sometimes precludes the procuring of enough

animal proteins, minerals and vitamins, which are chiefly derived from the foods which are relatively expensive as sources of calories.

The following table gives the cost of purchasing 100 calories of different foodstuffs in Switzerland (1936), Belgium (1932), Italy (1933) and Denmark (1936).

Table VI.

COST OF 100 CALORIES OBTAINED FROM VARIOUS FOODS.

		<i>Switzerland (1936).^a</i>	
	Centimes		Centimes
Flour (wheat)	1.04	Pears ^b	8.85
Sugar	1.07	Carrots ^b	10.39
Oatmeal.	1.29	Cabbage ^b	10.90
Barley	1.30	Pork	11.41
Bread	1.48	Honey	11.75
Rice	1.59	Peas	11.96
Macaroni	1.68	Eggs, foreign ^b	12.06
Potatoes (by 100 kg.) . .	2.28	Eggs, home produced ^b . .	(14.51)
" (by 1 kg.)	(3.04)	Mutton	13.36
Lard	2.36	Oranges ^b	14.92
Prunes (dried)	3.58	Bananas ^b	18.56
Cocoa	4.09	Spinach ^b	23.21
Milk	4.37	Tomatoes, home produced ^b	23.80
Bacon:	5.23	Tomatoes, foreign ^b	(26.42)
Apples ^b	6.08	Veal	25.00
Butter	6.12	Cod	48.57
Beans	7.63	Chicken.	63.39
Cheese	7.83		

		<i>Belgium (1932).^c</i>	
	Franc		Franc
Bread	0.06	Fresh beef	0.77
Lard	0.12	Pork cutlets.	0.83
Potatoes	0.13	Fruit	0.90
Margarine	0.18	Vegetables	0.95
Butter	0.24	Eggs	1.00
Milk	0.28		

^a Calculated on the basis of scale of calorie values given in SHERMAN: "Chemistry of Food and Nutrition" (Appendix B), and official retail-price statistics (*La Vie Economique*).

^b Prices during the cheapest quarter.

^c E. J. BIGWOOD and G. ROOST: "L'Alimentation rationnelle". Brussels, 1934, page 229.

Table VI (continued).

Italy (1933). ^a		Denmark (1936). ^b	
	Centesimi		Øre
Beans and other dried vegetables	2.06	Bread (rye, black)	0.8
Maize flour	2.74	Sugar (half refined)	1.0
Figs and dried prunes	3.01	„ (cut)	1.4
Rice	4.15	Potatoes	1.4
Chestnuts	4.31	Vegetable margarine	1.5
Wheat flour	4.67	Rice	1.6
Potatoes	8.21	Oatmeal	1.8
Butter	15.00	Lard	2.1
Sugar	15.69	Dried peas	2.5
Milk	15.86	Bread (white)	2.8
Fresh fruit	20.60	Butter	3.0
Citrus fruit	25.88	Prunes	3.8
Pork	28.41	Milk	4.4
Green vegetables	30.51	Fresh herrings	8.8
Cheese	33.34	Eggs	8.8
Beef	34.59	Beef (fore-quarter)	9.7
Mutton, goat	39.82	Veal (fore-quarter)	12.3
Eggs	48.05	Beef (hind-quarter)	12.4
Bananas	84.16	Cod	14.4
Fresh and frozen fish	87.21	Filet (beef ?)	16.7

^a *Annuario Statistico Italiano*, 1935, page 164.

^b *Statistiske Efterretninger*, No. 4, February 6th, 1929, page 30; and *Annuaire statistique danois*, 1936, page 95 (publication of the Statistical Department).

In spite of minor differences, it will be seen that, in most cases, the sources of "good protein" and foods rich in mineral and vitamin content tend to concentrate at the more expensive end of the scale. This applies particularly to fruit, vegetables, meat, fish and eggs; while dairy products, also highly "protective", occupy an intermediate position.

It should not be thought, however, because the protective foods tend to be expensive as sources of calories, that they are expensive foods. On the contrary, Table VII below shows that they are relatively cheap as sources of minerals and vitamins—nutrients to which the new science of nutrition attaches particular importance. The table, which is taken from an American study¹ covering

¹ "Nutritive Value of Diets of Families of Wage-earners and Clerical Workers in North Atlantic Cities, 1934/35" in *Monthly Labor Review* (Washington, July 1936).

employed wage-earners in North Atlantic cities in the winter of 1934/35, compares the proportion of their total food expenditure which these families allotted to seventeen different groups of food, and the proportion of their total consumption of calories and various nutrients derived from these groups of foods.

Table VII.

AVERAGE DISTRIBUTION OF EXPENDITURES AMONG, AND PERCENTAGE OF NUTRITIVE VALUES SECURED FROM, SPECIFIED GROUPS OF FOOD (UNITED STATES).

(Families spending \$2.38 to \$3.00 weekly per food-cost unit. ^a)

Food group	Percentage of food money allocated	Percentage furnished of:								
		Calo-ries	Pro-tein	Cal-cium	Phos-phorus	Iron	Vita-min A	Vita-min B	Vita-min C	Vita-min G (B ₁₂)
Eggs	4.96	1.69	4.88	2.73	4.07	6.33	6.04	2.83	0	5.33
Milk, cheese, ice-cream . . .	12.14	9.79	15.96	60.67	26.40	6.06	13.90	12.42	5.28	34.23
Butter, cream	7.57	9.32	0.42	1.44	0.77	0.52	16.00	0.16	0	0.43
Other fats	2.96	7.82	0.51	0.10	0.68	0.73	0.84	0.01	0	1.06
Meats, poultry, fish	25.51	12.91	36.17	2.73	24.58	31.83	7.14	37.42	0.67	32.22
Sugar and sweets	4.21	12.37	0.15	2.09	0.34	2.59	0	0	0	0
Bread and other baked goods	13.80	19.93	16.90	9.32	11.70	11.28	2.83	4.67	0.52	5.11
Ready-to-eat cereals	0.53	0.69	0.74	0.44	2.43	1.53	0.02	1.04	0	0.46
Flour and other cereals . . .	3.28	9.63	9.62	2.27	7.00	6.31	0.64	2.40	0.11	0.12
Potatoes, sweet potatoes . .	1.47	5.82	4.37	3.38	7.80	11.41	2.60	13.41	22.83	7.18
Dred legumes, nuts	1.82	2.90	5.26	3.41	6.75	8.70	0.22	8.67	0	0.80
Tomatoes	1.49	0.34	0.38	0.47	0.61	0.64	9.52	1.99	7.82	0.60
Citrus fruit	3.15	1.05	0.51	3.00	0.88	1.84	0.56	5.27	29.56	3.30
Leafy, green, yellow veget- ables	3.89	0.82	1.42	3.38	2.26	3.72	33.70	4.16	12.76	3.69
Other vegetables	3.43	1.04	1.00	2.79	1.73	2.08	1.28	1.57	8.12	1.23
Other fruits	3.88	2.77	0.69	1.42	1.54	4.14	4.63	3.75	12.33	3.86
Miscellaneous items	5.91	1.11	1.02	0.35	0.46	0.29	0.07	0.23	(b)	0.38
Total	100	100	100	100	100	100	100	100	100	100

^a See footnote a, page 253.

^b Less than 1/100 of 1%.

II. The improvement in diet which accompanies rising income is, then, chiefly due to the fact that calories are purchased from more varied and expensive sources which are usually, although not always, more nutritive. The price paid per 10,000 calories in Sweden by families with different incomes per head is shown in the following figures:

Table VIII.

RELATION OF INCOME TO PRICE OF CALORIES.

Sweden (1933).^a

Income per consumption unit ^b Kr.	Cost of 10,000 calories Øre
<i>Workers:</i>	
Below 700.	250
700-1,450	310
1,450 and over	369
<i>Middle-class families:</i>	
1,005-1,530	295
1,530-2,585	373
2,585 and over	442

^a *Sociala Meddelanden*, 1935, No. 3, page 188.
^b Scale *d*.

12. A very rough measure of the nutritive quality of a diet is given by the proportion of calories and proteins derived from animal and vegetable sources. In the following examples (Table IX), taken from the German and Polish family budget enquiries, a steady increase in the percentage both of proteins and calories derived from animal sources will be seen to accompany a rising income per consumption unit.

Table IX.

NUTRITIONAL ANALYSIS OF DIETS OF GERMAN AND POLISH WORKERS.

Polish Workers (1927).^a

Total expenditure per consumption unit ^b Zloty	Protein			
	Animal		Vegetable	
	Grammes	%	Grammes	%
Below 600.	12.9	25.65	37.4	74.35
600-899	24.0	37.21	40.5	62.79
900-1,199	32.1	42.97	42.6	57.03
1,200 and over	44.6	52.97	39.6	47.03

^a "Budget des familles ouvrières, 1927". *Statystyka Polski*, Tome XL, zeszyt 1.
^b Scale *a*.

Table IX (continued).

	Calories			
	Animal		Vegetable	
		%		%
Below 600.	326.8	13.68	2,061.4	86.32
600-809	575.7	20.28	2,263.0	79.72
900-1,199	756.1	23.95	2,400.3	76.05
1,200 and over	987.8	29.84	2,322.5	70.16

German Workers (1927/28).^a

Annual income per consumption unit ^b RM.	Protein			
	Animal		Vegetable	
	Grammes	%	Grammes	%
Under 800	30.7	44.62	38.1	55.38
800-1,000	38.2	49.42	39.1	50.58
1,000-1,200	42.7	52.01	39.4	47.99
1,200-1,500	48.5	56.07	38.0	43.93
1,500 and over	55.5	58.30	39.7	41.70

	Calories			
	Animal		Vegetable	
		%		%
Under 800	895	35.38	1,635	64.62
800-1,000	1,036	37.39	1,735	62.61
1,000-1,200	1,104	38.63	1,754	61.37
1,200-1,500	1,219	41.10	1,747	58.90
1,500 and over	1,313	41.12	1,880	58.88

^a *Einzelschriften zur Statistik des Deutschen Reiches*, No. 22.
^b Scale *f* for protein and calorie intake; average of scales *f* and *g* for incomes.

13. A more exact analysis of the nutritive value of diets purchased at different food expense levels has been made for certain employed wage-earners and low-salaried clerical workers in the United States in 1934-1936 by the Bureau of Home Economics, Department of Agriculture.¹ The following table shows per "nutrition unit" ² the average annual energy value and content of various nutritive elements consumed by families with different food expense levels in the North Atlantic region, December 1934-February 1936.

¹ "Diets of Families of Wage-earners and Low-salaried Clerical Workers living in Industrial Communities in Three Regions of the United States, 1934-1936." Bureau of Home Economics, February 1937. (Mimeographed.)

² Bureau of Home Economics scales. See footnote, page 253. •

Table X.

**RELATION OF INCOME TO INTAKE OF CALORIES AND VARIOUS NUTRIENTS
(UNITED STATES).**

(Value per nutrition unit.)^a

Weekly food expenditure per food cost unit ^b \$	Energy value Calories	Protein Grammes	Calcium Gramme	Phosphorus Grammes	Iron Gramme	Vitamin A International units	Vitamin B ₁ International units ^c	Vitamin C Sherman units	Vitamin G (B ₂) Sherman units
1.33-1.99	2,540	64	0.440	1.08	0.0114	5,740	100	800	470
2.00-2.66	2,960	74	0.546	1.25	0.0133	7,700	120	1,150	580
2.67-3.32	3,370	88	0.663	1.47	0.0155	9,380	150	1,400	700
3.33-3.99	3,830	98	0.737	1.62	0.0173	11,760	170	1,750	820
4.00-4.66	4,130	116	0.841	1.87	0.0203	15,820	200	1,950	950

^a A "nutrition unit" is taken by the Bureau of Home Economics to represent 3,000 calories, 70 grm. protein, 68 grm. calcium, 1.32 grm. phosphorus, 0.015 grm. iron, 8,400 International units vitamin A (= about 6,000 Sherman units), 150 International units vitamin B₁ (= about 600 Sherman units), and 600 Sherman units vitamin G (B₂). The following scales of relative requirements for different ages and sexes have been used for comparing the content of calories and various nutrients in the diets.

Individuals by age and sex	Cost	Energy value	Protein	Calcium	Phosphorus	Iron	Vitamin A	Vitamin B ₁	Vitamin C	Vitamin G (B ₂)
Child under 4 years	60	40	70	150	80	40	75	40	70	75
Boy 4-6; girl 4-7	70	50	80	150	80	50	75	50	70	75
Boy 7-8; girl 8-10	90	70	100	150	80	70	90	70	70	90
Boy 9-10; girl 11-13	95	80	110	150	90	80	90	80	80	90
Boy 11-12; girl 14-19	100	83	110	150	90	90	100	83	90	100
Boy 13-15 years	110	100	110	130	100	100	100	100	100	100
Boy 16-19 years	112	120	110	130	100	100	100	120	120	100
Woman 20-74 years	95	(To be determined)	100	130	100	100	100	100	100	100
Man 20-74 years	100	determined	100	100	100	100	100	100	100	100
Over 75 years	90	mined daily)								

^b A "food cost unit" is a consumption unit based on the cost of adequate diets for individuals of different ages and sexes as shown in the table in footnote ^a.

^c The content of these diets in respect of vitamins A, B and C was expressed, in the original document from which this table is taken, in terms of Sherman units, as follows:

Weekly food expenditure per food cost unit \$	Vitamin		
	A	B (B ₁)	C
1.33-1.99	4,100	400	80
2.00-2.66	5,500	490	115
2.67-3.32	6,700	580	140
3.33-3.99	8,400	680	175
4.00-4.66	11,300	790	195

Owing to the fact that Sherman units and International units are computed according to quite different principles, no exact conversion is possible. The Sherman units for vitamins A, B₁, C and G (B₂) are biological units, based on the biological response of animals—a response subject to great variation under apparently similar conditions of experiment. The International units for Vitamins A, B₁, C and D, on the other hand, are based upon the vitamin activity of standard, stable materials, appropriately chosen for vitamins A, B₁, C and D respectively, these standard materials in suitable dosage being simultaneously included in every test as standards of comparison. The expression of the quantities of vitamins A, B₁ and C in terms of International units in the above table are based on the following approximate conversion coefficients computed by Dr. Harriette Chick, of the Lister Institute:

Vitamin A:	1 Sherman unit equivalent to	1.4 International units
Vitamin B ₁ :	" " " " " "	0.25 " "
Vitamin C:	" " " " " "	10 " "

No international standard or unit at present exists for vitamin G (B₂).

Both quantitatively and qualitatively, an improvement takes place as the total food expenditure per food-cost-unit increases.

Similar data relating to European urban families in South Africa¹ are given below in Table XI.

Table XI.
CONSTITUENTS OF FOOD CONSUMED PER MAN-UNIT^a PER DAY
(UNION OF SOUTH AFRICA).

Annual family income	Proteins (grammes)				Fats (grammes)	Carbo-hydrates (grammes)
	Milk	Other animal products	Vegetable products	Total		
Up to £125	6	30	65-67	101-103	60-68	626-633
£125-£150	6	32	60-61	98-99	59-66	561-569
£150-£175	7	31-32	58	96-97	63-72	551-557
£175-£200	8	36-37	61-62	105-107	70-78	581-594
£200-£225	11	35-36	53-55	99-102	74-82	531-542
£225-£250	14	41-42	57-59	112-115	93-105	585-600
£250-£275	12	39-40	55-56	106-108	85-97	529-544
£275-£300	15	39-41	56-57	110-113	91-102	543-560
£300-£325	15	41-43	56-58	112-116	95-108	550-569
£325-£350	17	44-46	57-60	118-123	106-121	569-592
£350-£375	17	45-47	57-59	119-123	108-121	566-588
£375-£400	16	42-45	55-57	113-118	102-115	539-562
£400-£425	17	45-47	56-58	118-122	107-122	555-577
£425-£450	17	43-46	56-58	116-121	108-122	556-581
£450-£475	17	47-50	56-58	120-125	109-124	553-580
£475-£500	16	51-54	56-58	123-128	110-125	561-588
£500-£525	17	49-51	52-55	118-123	111-125	530-557
£525-£550	18	50-54	55-58	123-130	114-129	543-573
£550-£575	17	49-51	52-55	118-123	112-127	544-571
£575-£600	18	50-54	58-60	126-132	117-131	558-587
Average all groups	15	43-45	56-58	114-118	98-110	554-574

^a Consumption-unit scale *k*; cf. page 243.

Annual family income	Calcium (milli-grammes)	Phosphorus (milli-grammes)	Iron (milli-grammes)	Calories
Up to £125	494-507	1,643-1,685	22-23	3,576-3,683
£125-£150	481-494	1,560-1,603	21-22	3,301-3,395
£150-£175	494-503	1,529-1,560	20-21	3,282-3,396
£175-£200	592-612	1,672-1,740	22-23	3,502-3,647
£200-£225	673-688	1,641-1,696	21-22	3,323-3,453
£225-£250	851-872	1,857-1,933	23-24	3,791-3,975
£250-£275	758-776	1,731-1,795	22-23	3,453-3,634

¹ Union of South Africa, Office of Census and Statistics, 1937: "Enquiry into the Expenditure of European Families in Certain Urban Areas, 1936".

Table XI (continued)

Annual family income	Calcium (milli-grammes)	Phosphorus (milli-grammes)	Iron (milli-grammes)	Calories
£275-£300	875-897	1,812-1,893	22-23	3,577-3,759
£300-£325	895-918	1,896-1,984	24-25	3,655-3,864
£325-£350	998-1,023	1,975-2,073	24-26	3,868-4,113
£350-£375	997-1,022	1,990-2,086	25-26	3,875-4,101
£375-£400	952-977	1,868-1,965	23-25	3,681-3,912
£400-£425	1,012-1,034	1,967-2,058	24-26	3,823-4,056
£425-£450	1,037-1,064	1,954-2,059	24-26	3,821-4,066
£450-£475	1,048-1,075	2,013-2,125	25-26	3,837-4,092
£475-£500	987-1,015	2,018-2,134	25-26	3,893-4,156
£500-£525	1,054-1,082	1,976-2,090	25-26	3,751-4,009
£525-£550	1,081-1,110	2,044-2,175	25-27	3,844-4,116
£550-£575	1,013-1,040	1,966-2,079	24-25	3,815-4,074
£575-£600	1,105-1,135	2,088-2,210	26-28	3,956-4,216
Average all groups	914-934	1,877-1,970	24-25	3,710-3,913

14. To illustrate further the point that the inferior composition of the diets obtained by the lower-income groups is largely necessitated by the exigencies of the price system, it may be interesting to cite some diets worked out by the Bureau of Home Economics in the United States as the best available at different costs.¹

Table XII.

FOUR DIETS AT VARYING LEVELS OF COST AND NUTRITIVE CONTENT (UNITED STATES).

	Restricted diet for emergency use	Adequate diet at minimum cost	Adequate diet at moderate cost	Liberal diet
Flour, cereals lb.	240	224	160	100
Milk or equivalent quarts	155	260	305	305
Potatoes lb.	165	165	165	155
Dried beans, peas, nuts lb.	30	30	20	7
Tomatoes, citrus fruits lb.	50	50	90	110
Leafy, green and yellow vegetables lb.	40	80	100	135
Dried fruits lb.	10	20	25	20
Other vegetables and fruits lb.	40	85	210	325
Fats (butter, oils, bacon, salt pork) lb.	45	49	52	52
Sugars lb.	50	35	60	60
Lean meat, poultry, fish lb.	30	60	100	165
Eggs dozens	8	15	15	30

¹ STIEBELING and WARD: "Diets at Four Levels of Nutritive Content and Cost". U.S. Department of Agriculture, Circular 296.

Optimum diets of the four types described in Table XII were calculated to cost respectively \$61, \$85, \$140 and \$165 per head per year at 1931/32 retail prices.

The percentage of calories obtained from the various foods are as shown in Table XIII.

Table XIII.
PERCENTAGE OF CALORIES FROM VARIOUS SOURCES IN THE
FOUR STANDARD DIETS.

	Restricted diet for emergency use	Adequate diet at minimum cost	Adequate diet at moderate cost	Liberal diet
Bread, flour, cereals	43	35	24	15
Milk	12	18	19	19
Fruit, vegetables	14	15	18	18
Fats	17	17	18	18
Sugars	9	7	9	9
Lean meat, fish, eggs	5	8	12	21

It can be seen that, in the opinion of the authors of these diets, the most intelligent distribution of expenditure requires those with very low incomes to rely largely on bread, flour and cereals as sources of calories; and that it is only as income available for expenditure on food rises that it is considered advisable to draw a larger proportion of calories from highly nutritious foods such as milk, fruit, vegetables, meat, fish and eggs.

C. INCOME ELASTICITY OF DEMAND FOR VARIOUS FOODS.

15. The effects of rising income on the consumption of various foodstuffs have been clearly shown in the report on "Workers' Nutrition and Social Policy" of the International Labour Office (Chapter III, Section 3).¹ It is there demonstrated (see Diagram II opposite) that the consumption of bread and cereals tends to fall with increasing income, and that the consumption of fats (in particular margarine) shows the same tendency, though less distinctly, whereas the consumption of meat, fish, milk products, fruit and vegetables all rise steadily with rising incomes.

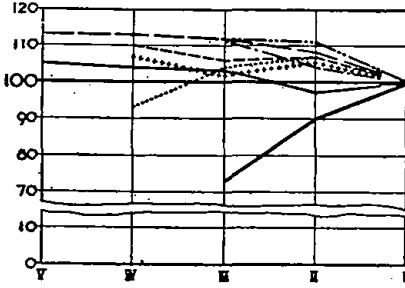
¹ "Workers Nutrition and Social Policy". Studies and Reports, Series B, No. 23 (Geneva, 1936).

Diagram II. ^a

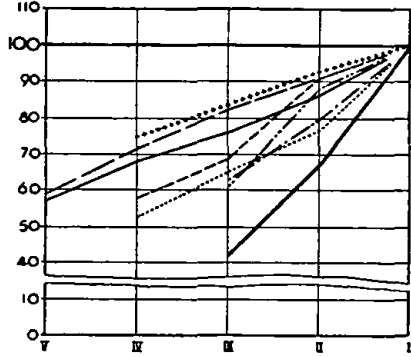
QUANTITIES OF FOODS CONSUMED IN DIFFERENT INCOME GROUPS.

(Consumption in the highest income groups in each case = 100.)

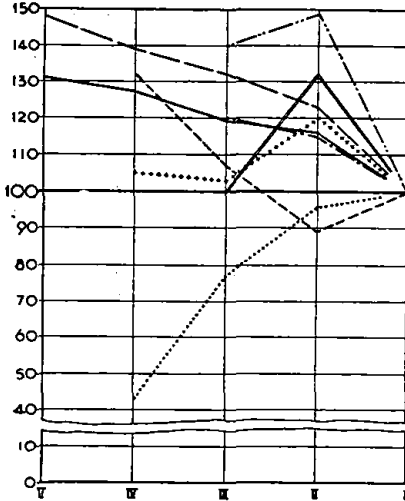
Cereals and bread



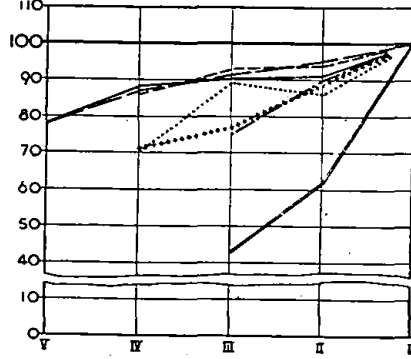
Meat and fish, etc.



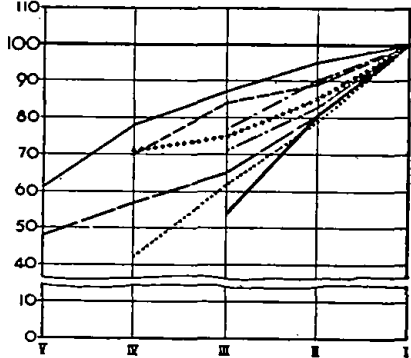
Margarine, fats, etc.



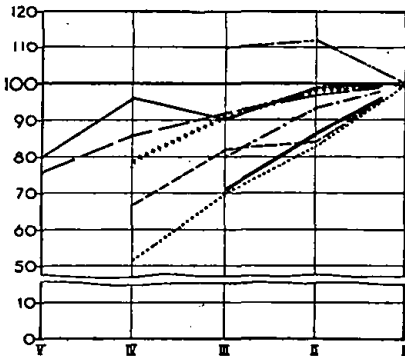
Vegetables and fruits



Milk, milk products and eggs



Sugar



- | | |
|---------------|----------------------|
| — Germany | Norway |
| - - - Belgium | Czechoslovakia |
| - · - Sweden | — U. S. A. |
| Poland | — United Kingdom |

Note. — The roman figures indicate income groups.

^a From International Labour Office: "Workers' Nutrition and Social Policy". Studies and Reports, Series B, No. 23 (Geneva, 1936).

16. Some examples, from the United States, Sweden and the Union of South Africa, may serve to illustrate the diversity of the reactions to increased income in the case of different food groups.

Table XIV.

RELATION OF ECONOMIC STATUS TO DEMAND FOR PARTICULAR FOODS.
United States of America (1935).^a

	Relative <i>per caput</i> consumption by families with annual expenditure per consumption unit <i>b</i> of:			
	Under \$300	\$300-\$399	\$400-\$499	\$500 and over
	%	%	%	%
Fruits, fresh, and juices	100	181	202	258
Fresh (non-leafy) vegetables.	100	124	185	249
Leafy vegetables	100	116	195	189
Meats, poultry, fish.	100	122	150	168
Eggs	100	134	145	168
Cheese	100	138	75	150
Butter and substitutes	100	124	124	133
Milk, cream and ice-cream	100	130	128	125
Potatoes	100	110	117	117
Bread	100	88	90	82

^a Faith WILLIAMS: "Food Consumption at Different Economic Levels", *Monthly Labour Review*, April 1936. Based on records of 181 families of wage-earners and lower-salaried clerical workers from representative cities in New England, U.S.A., spring 1935.

^b The consumption-unit scale employed is a composite one, based on relative expenditures of persons of different ages and sexes on food and clothing, and expenditure *per caput* on other items.

Sweden (1933).^a

Relative consumption per consumption unit *b* by families with income per consumption unit of:

	<i>Workers and lower officials¹</i>			<i>Middle-class families</i>		
	Below 700 kr.	700-1,450 kr.	1,450 kr. and over	1,005-1,530 kr.	1,530-2,585 kr.	2,585 kr. and over
	%	%	%	%	%	%
Cream	100	300	405	100	164	181
Fresh vegetables	100	167	233	100	132	204
Butter	100	151	205	100	131	171
Fruit	100	150	195	100	152	194
Eggs	100	146	171	100	135	163
Meat and bacon	100	126	163	100	111	130
Fish	100	133	152	100	102	128
Full milk	100	120	132	100	104	106
Cheese	100	119	129	100	102	115
Bread	100	111	126	100	137	123
Potatoes	100	108	110	100	104	119
Margarine	100	94	82	100	99	92

^a From *Sociala Meddelanden*, No. 12, 1934.

^b Scale *d*.

Table XIV (continued)
Union of South Africa (1936).^a

	Relative consumption per consumption unit ^b by families with incomes of:		
	Up to £175	£325-£400	£525-£600
	%	%	%
Bacon	100	1,830	2,230
Eggs	100	596	822
Milk (fresh)	100	390	430
Cheese	100	322	372
Fish (fresh)	100	235	333
Vegetable and fruit (value)	100	246	314
Butter	100	186	206
Jam and syrup	100	190	204
Meat (fresh)	100	112	112
Potatoes	100	99	92
Oatmeal, rice, maize meal	100	96	88
Sugar	100	92	88
Bread and flour	100	74	70
Tea and coffee	100	71	59
Milk, condensed	100	42	15

^a Union of South Africa, Office of Census and Statistics, 1937: "Enquiry into the Expenditure of European Families in Certain Urban Areas, 1936".

^b Scale *k*.

In each case, important increases are to be seen in fruit, vegetables, dairy produce, meat and eggs; all these changes improve the quality of the diet.

17. Changes may also be observed in the composition of the separate groups of food in response to rising income. As regards the relative consumption of different fats, an improvement in nutritional quality is normally found to accompany increased expenditure.

Table XV.
RELATION OF INCOME TO QUALITY OF FAT CONSUMPTION
AMONG GERMAN WORKERS ^a (1927/28).

(Percentage expenditure on various fats.)

	Annual income per consumption unit ^b				
	Under RM 800	RM 800- 1,000	RM 1,000- 1,200	RM 1,200- 1,500	RM 1,500 and over
Butter	26.6	37.1	43.3	52.4	62.4
Crude fat	3.9	4.1	3.2	2.8	2.4
Lard and dripping	16.2	14.2	14.0	10.8	9.6
Margarine	47.1	38.5	32.8	28.3	19.3
Oil and vegetable fats.	6.2	6.1	6.7	5.7	6.3

^a *Einzelschriften zur Statistik des Deutschen Reiches*, No. 22.

^b Average of scales *f* and *g* for income; scale *f* for fat expenditure.

18. In the case of bread, the influence of rising income is often contrary to the proscriptions of nutritional experts. Thus, in a number of countries, consumers with higher food expenditure purchase a larger proportion of refined white bread and less of the more nutritious wholemeal breads. In the Scandinavian countries, however, the contrary tendency is usually to be observed.

D. INFLUENCE OF SIZE AND AGE OF FAMILY.

19. As most food purchasing is conducted for the family household as a whole, not only the family income, but also the number of persons and the composition of the family are of importance in determining the adequacy of nutrition.

20. A clear correlation is normally to be found between the size of families and both family income and income per consumption unit. In general, the larger the family the larger is family income, but the smaller is the income per consumption unit. The first relation arises from the greater earning possibilities of members of the family other than the head, while the second is due to the necessity for dividing an income, normally derived at least mainly from one source, among an increased number of family members. The effect of a larger family in increasing family income is generally more marked among workers than among middle-class families, where the age at which children begin to earn tends to be higher and where their earnings are generally small in relation to those of the head of the family.

21. The influence of an increase in the number of young children on consumption per consumption unit is, for the main part, similar to that of a decrease in income: both quantity and quality of diet tend to fall¹ so long as income is not adjusted to meet the increased needs. As in the case of a reduction of income, the necessity for supporting a more numerous family on a given income generally leads to an increase in the proportion of total expenditure devoted to food, but a decrease in the absolute food expenditure per consumption unit.²

¹ Cf. *Einzelschriften zur Statistik des Deutschen Reiches*, No. 22, page 72.

² *Mitteilungen des Statistischen Staatsamtes der Tschechoslowakischen Republik*, 1933, Nos. 199-207.

The accompanying table indicates the effect of size of family on individual consumption among certain Czechoslovak workers.¹ It can be seen that, with an increase in the number of children, the unit consumption of butter, milk, eggs, cheese, fruit and vegetables tends to fall, while that of bread, potatoes and artificial fats show the opposite tendency; in short, if income is unchanged, when the size of a family increases, diet appears to become more filling but less nutritious.

Table XVI.

RELATION OF FAMILY SIZE TO CONSUMPTION PER CONSUMPTION UNIT ^a
OF VARIOUS FOODS AMONG CZECHOSLOVAK WORKERS (SEVENTY-NINE FAMILIES).

Number of consumption units:	Family income: Below 16,000 Kr.		16,001-30,000 Kr.					30,001-40,000 Kr.			
	1.8-2.5	2.6-3.4	1.8-2.5	2.6-3.4	3.6-4.3	4.6-4.7	5.9-6.1	4.3-4.4	5.0	5.6-6.2	
Butter kg.	5.63	3.81	7.5	4.0	3.9	1.4	0.4	5.6	4.8	2.0	
Milk litre	217	182	238	189	146	114	117	179	161	130	
Eggs number	224	134	237	226	136	69	135	177	160	122	
Cheese . . . crowns	37	20	45	38	22	18	24	30	42	25	
Fruit crowns	132	62	142	122	61	83	36	152	101	86	
Vegetables. crowns	109	86	123	96	81	37	47	71	91	55	
Potatoes . . . kg.	126	86	89	114	76	117	114	67	136	137	
Bread kg.	88	96	86	120	117	171	116	106	127	133	
Artificial fat . . kg.	2.6	3.0	2.3	3.5	2.5	8.6	5.6	1.4	0.7	6.9	

^a Scale c.

Similarly, from the German family budget enquiry it appeared that families with four children spent per consumption unit 75% less on butter, 60% less on eggs, 64% less on fruit, 54% less on vegetables, 52% less on meat and meat products and 54% less on fish than families with the same income but without children. On the other hand, they spent 37% more on black bread (but 35% less on white bread), 26% more on potatoes and 71% more on margarine.²

22. Where the income is inadequate and the family large, there is thus particular danger of nutritional deficiencies. This is the more disturbing in view of the emphasis laid by nutritional experts

¹ *Mitteilungen des Statistischen Staatsamtes der Tschechoslowakischen Republik*, 1931, Nos. 225-229, page 1862; see also *ibid.*, 1933, Nos. 199-207, page 1570.

² TYSZKA: "Ernährung und Lebenshaltung des Deutschen Volkes" (Berlin, 1934), page 40.

on the particularly ill effects of malnutrition on the young. The reassuring doctrine that "with every mouth is born a pair of hands" is cold comfort for parents with a large family of small children whose mouths require feeding, but whose hands are not yet capable of contributing anything towards the process. The danger of malnutrition seems particularly serious in such cases.

23. Perhaps the most significant feature of the deterioration of nutrition to be found in large families among the lower-income groups is the decline in the consumption of milk. Milk has been established by nutrition experts to be not only the most valuable element in the diet of children, but also an element for which no substitute has been found. A decline in milk consumption by young children is therefore practically synonymous with a deterioration in their nutrition.

In an enquiry into the milk consumption of 1,000 poor families attending infant welfare centres in Durham, England, the average weekly quantity of fresh milk purchased per head was found¹ to decrease steadily with an increase in the size of the family.

Table XVII.
RELATION OF FAMILY SIZE TO MILK CONSUMPTION.
(DURHAM, ENGLAND.)

Number in family	Av. fresh milk purchased per head per week Litres	Number in family	Av. fresh milk purchased per head per week Litres
2	0.74	8	0.17
3	0.40	9	0.17
4	0.28	10	0.15
5	0.23	11	0.15
6	0.23	12	0.11
7	0.23		

A similar tendency among workers in Czechoslovakia can be seen from Table XVI above, and the same phenomenon was shown in an enquiry covering 9,728 families in fifty-nine cities of the United States in 1936.² All the families consisted of two adults

¹ Mrs. C. H. BURNS: "Study of Milk Consumption in County Durham", *Journal of State Medicine*, Vol. XLI, No. 7.

² "A Survey of Milk Consumption in Fifty-nine Cities in the United States." Consumers' Counsel Division Agricultural Adjustment Administration, Dept. of Agriculture, June 1936.

and varying numbers of children; an almost constant decrease in *per caput* milk consumption is seen to accompany an increase in the number of children.

Table XVIII.

RELATION OF FAMILY SIZE TO MILK CONSUMPTION
(UNITED STATES: FIFTY-NINE CITIES).

Children in family	Weekly consumption per head of whole milk and whole-milk equivalent of evaporate milk Litres	Children in family	Weekly consumption per head of whole milk and whole-milk equivalent of evaporate milk Litres
0	3.15	6	1.82
1	3.48	7	1.70
2	3.33	8	1.66
3	2.97	9	1.68
4	2.60	10	1.39
5	2.19		

The following table shows the *per caput* milk consumption in families in Minneapolis, U.S.A., of varying composition. They are classed in two different groups according to income per head, so that the direct relation of family size to milk consumption (and not only the indirect effect exercised through income) may be seen.¹

Table XIX.

RELATION OF FAMILY SIZE TO MILK CONSUMPTION
(MINNEAPOLIS, U.S.A.).
(In litres per head per day)

Number of children	<i>Per caput</i> income below \$300 Number of adults				<i>Per caput</i> income \$300-\$599 Number of adults				
	2	3	4	5	1	2	3	4	5
0 . .	0.39	0.42	0.36	0.30	0.62	0.54	0.45	0.41	0.38
1 . .	0.48	0.43	0.43	0.38	—	0.60	0.53	0.51	—
2 . .	0.56	0.46	0.43	0.43	—	0.59	0.55	0.53	—
3 . .	0.51	0.43	0.39	—	—	0.62	—	—	—
4 . .	0.49	0.60	—	—	—	—	—	—	—
5 . .	0.47	—	—	—	—	—	—	—	—

A general tendency can be seen for the consumption of milk per head to increase in families containing a larger, and to decrease

¹ WAITE and COX: "Study of the Consumption of Dairy Products in Minneapolis, 1934." University of Minnesota, Agricultural Experiment Station, Bulletin 311, October 1934.

in those containing a smaller, proportion of children to adults. The tendency corresponds to the prescriptions of nutrition experts, and, like other such prescriptions, is more clearly to be discerned in the higher than in the lower income group.

24. It has been shown above that nutrition in large families tends to be inferior to that of smaller families, owing to the reduction of income per consumption unit which normally accompanies an increase in the size of the family. In a recent enquiry in Sweden, it has been suggested that large families tend to enjoy less adequate nutrition than small families, for other reasons in addition to the reduction of income per head usually involved.¹ The following table shows the consumption of three family type groups containing respectively the following number of consumption units: 1.9 (families without children), 2.8 (families with two children under 7 years) and 4.1 (families with two or three children, one or more 15 years or over). The income per consumption unit varies within relatively narrow limits.

Table XX.

RELATION OF FAMILY TYPE TO CONSUMPTION OF CALORIES
AND VARIOUS NUTRIENTS (SWEDEN).

Consumption units ^a per family	1.9	2.8	4.1
Income per family kronor	2,559	3,640	5,750
Income per consumption unit . . . kronor	1,347	1,300	1,401
Calories	3,732	3,393	3,304
Calories (animal)	1,711	1,575	1,502
Proteins grammes	100	97	94
Animal proteins grammes	62	60	57
Fat grammes	146	134	130
Butter-fat grammes	65	62	58
Carbohydrates grammes	461	420	393
Calcium grammes	1.27	1.29	1.09
Phosphorus grammes	1.90	1.89	1.70
Iron milligrammes	18	17	16

^a Scale *c*.

From this table, it would appear that, even when income per consumption unit is similar, an increase in the size of family is accompanied by a decreased consumption of practically all nutrients.

¹ Dr. Ernst ABRAMSON: "Preliminary Report on the Composition of Swedish Diets." Stockholm, 1937.

If the tentative results of the Swedish investigation are confirmed by other investigations elsewhere, it will serve to reinforce the conclusion already reached that particular attention, through family allowances, provision of supplementary food, education and other means, must be paid to the question of nutrition of children.

E. ADEQUACY OF INCOME FOR NUTRITION.

25. The preceding sections have been mainly directed towards demonstrating the influence of income on actual consumption. An alternative approach to the question of the relationship between income and nutrition is to compare the minimum cost of adequate diets in various countries with the incomes actually available for the purchasing of such diets. A study along these lines requires a close acquaintance with local conditions, available foodstuffs, relative prices, climate, occupations, family composition and earnings, level of non-food expenditure, etc. Unfortunately, not many such studies appear to have been made; an interesting example may, however, be cited from Stockton-on-Tees, in the north of England.¹

Family expenditure accounts were collected from 141 employed families selected as representative of their class. The irreducible expenses on non-food items (rent, fuel and light, insurance, doctor, household utensils and cleaning, clothing, subscriptions, etc.) were subtracted from net income (wages minus statutory deductions for unemployment and health insurance) in order to calculate the weekly sums available per man value for food purchase. The result is shown in the following table:

Table XXI.

DISTRIBUTION OF FAMILY INCOME AND FOOD EXPENDITURE PER MAN VALUE
(STOCKTON-ON-TEES, ENGLAND).

Family income	% of cases	Sums available for food purchase per man value ^a
25s.-35s.	33	4s. 3d.
35s.-45s.	28	4s. 4d.
45s.-55s.	22	4s. 11d.
55s.-65s.	12	5s. 9½d.
70s.-80s.	5	8s. 1½d.

^a Scale *h*.

¹ MCGONIGLE and KIRBY, *op. cit.*

These figures may be compared with the cost of a specimen diet laid down by the British Medical Association as the minimum requisite to maintain health and working capacity. Such a diet was calculated to cost 7s. per man value, at retail prices ruling at Stockton-on-Tees in June 1935. From the above table, therefore, it appears that a large proportion of the families included in the enquiry had not enough money available for expenditure on food to purchase what is considered to be a minimum adequate diet. It is impossible to say to what extent this sample is representative of the general situation in Great Britain. Sir John ORR (in Chadwick Lecture, 1934) estimated the number of those living "near or below the threshold of adequate nutrition" as a result of deficiency of income as about 10 millions; MCGONIGLE and KIRBY¹ even regard this as an understatement.

An indication of the situation in the United States is given by STIEBELING and WARD in connection with their calculation of diets at various cost levels. The cheapest diet—"restricted diet for emergency use"—cost, as 1931/32 retail prices, \$61. The diet was intended to provide minimum nutritive requirements, allowing little safety margin, and not recommended for use over long periods. It is stated that this diet had a higher retail value than the food which could be purchased out of the relief allowances received by the unemployed during 1931-1933. It was further added that, "unfortunately, many families find it necessary, even in normal times, to live for long periods on supplies of food less plentiful and less well balanced than the restricted diet here suggested for emergency use".

The following preliminary results of an enquiry conducted by the Bureau of Labour Statistics shows the percentages of representative samples of families of employed wage-earners and lower-salaried clerical workers which spent sufficient on food to obtain the "adequate diet at minimum cost" recommended by the Bureau of Home Economics. The prices with which the quantities of the adequate diet were weighted were average prices; it is possible that, by careful shopping, these foodstuffs could have been obtained at less than average prices.

¹ *Op. cit.*, page 191.

Table XXII.

PERCENTAGE OF FAMILIES WITH ANNUAL FOOD EXPENDITURES LARGE ENOUGH TO BUY THE BUREAU OF HOME ECONOMICS "ADEQUATE DIET AT MINIMUM COST".

Region, city and State	Year ending <i>a</i>	Cost of adequate diet <i>b</i>	Number of families		Percentage of families spending per adult <i>c</i> equivalent:			
			White	Negro	Enough for adequate diet <i>b</i>		Not enough for adequate diet <i>b</i>	
		\$			White	Negro	White	Negro
<i>North Atlantic:</i>								
Boston, Mass. . .	28.II.35	122.25	516				73.6	26.4
Buffalo, N. Y. . .	29.II.36	125.35	450				76.9	23.1
Manchester, N.H..	31.VIII.34	116.56	146				63.0	37.0
New York, N. Y. . .	31.V.35	130.30	897	100		87.3	64.0	12.7 36.0
Philadelphia, Pa..	30.XI.34	120.18	498	101		75.3	39.6	24.7 60.4
Pittsburgh, Pa. . .	30.XI.34	116.40	346	97		67.6	38.1	32.4 61.9
Portland, Me. . . .	29.II.36	131.17	153			49.7		50.3
Scranton, Pa. . . .	30.XI.34	122.26	231			72.7		27.3
<i>East North Central:</i>								
Cincinnati, O. . . .	29.II.36	127.39	352	100		81.8	42.0	18.2 58.0
Cleveland, O. . . .	31.V.36	126.84	490			80.0		20.0
Detroit, Mich. . . .	28.II.35	102.00	598			89.5		10.5
Indianapolis, Ind.	29.II.36	120.14	203	101		67.0	29.7	33.0 70.3
Milwaukee, Wisc..	29.II.36	120.43	446			76.5		23.5
<i>West North Central:</i>								
Denver, Colo. . . .	28.II.35	111.04	295			83.1		16.9
Kansas City, Mo..	29.II.36	125.48	357	103		56.9	37.9	43.1 62.1
Minneapolis and St. Paul, Minn..	29.II.36	123.92	504			67.5		32.5
St. Louis, Mo. . . .	29.II.36	125.68	401	106		76.8	46.2	23.2 53.8
<i>Pacific:</i>								
San Francisco . . .	31.V.35	127.84	446			85.9		14.1
Seattle, Wash. . . .	28.II.35	115.27	352			80.4		19.6
<i>Southern:</i>								
Baltimore, Md.. . .	29.II.36	128.65	419	107		68.0	24.3	32.0 75.7
Birmingham, Ala.	30.XI.34	118.01	202	101		56.9	15.8	43.1 84.2
Houston, Tex. . . .	29.II.36	120.22	258			67.4		32.6
Jacksonville, Fla..	31.VIII.35	127.66	178			65.7		34.3
Memphis, Tenn. . .	30.XI.34	112.53	194	94		62.4	27.7	37.6 72.3
Mobile, Ala.	28.II.35	113.31	146	94		50.7	12.8	49.3 87.2
New Orleans, La..	30.XI.34	107.03	318	83		67.6	30.1	32.4 69.9
Norfolk- Portsmouth, Va.	29.II.36	128.02	162	109		63.6	21.1	36.4 78.9
Richmond, Va. . . .	30.XI.34	118.51	193	96		55.4	20.8	44.6 80.0

a In most of the cities included in the investigation, some of the data apply to months before and after the year indicated in this column, but in all cases, except New York City, more than 50% of the data apply to the year given.

b Bureau of Home Economics adequate diet at minimum cost for a man at moderate work in the year to which the greater part of the expenditure figures apply.

c Number of adult equivalents per family measured in terms of adequate-food-cost units, based on relative cost of adequate diet at minimum cost for persons of different age and sex.

Apart from the possibility of reducing non-food expenditure—which, as already indicated, is usually restricted—it can be seen that considerable proportions of the employed population, and particularly of the negro families, in most of these towns were suffering from malnutrition *owing to insufficiency of income*. Probably the proportion whose diets actually were defective was considerably greater, since many of the families may have been less skilful in apportioning their food expenditure than is assumed by the Bureau of Home Economics.

F. DETERMINANTS OF INCOMES.

26. The preceding sections of this chapter have shown that income exercises a considerable influence on nutrition, particularly among the lower-income groups, where, even in countries with the highest planes of living, it is in some cases so restricted that the purchase of an adequate diet becomes an economic impossibility.

27. Two classes of income influences may be distinguished: those affecting the size of the national dividend as a whole, and those affecting its distribution among different groups of income-receivers.

28. The factors determining national income may again be separated into two distinct classes. In the first place, there are the secular, long-term influences—the degree of economic development, the availability of natural resources, accumulation of capital, efficiency of labour, etc. The effects of the secular rise in national income and in the general plane of living on food-consumption habits have been indicated in Chapter I.

29. The trend of growth in the national income has, unfortunately, seldom taken the form of a smooth, uninterrupted process. It has been characterised by alternating advances and recessions, a wave-like movement which towards the end of the nineteenth century had become familiar in all the more developed industrial countries as the phenomenon of the “business cycle”. The second type of determinant of the total national income, which may be characterised as “business-cycle influences”, affects the efficiency of the utilisation of available resources—*i.e.*, the degree

to which the long-period maximum of the national income is approached at any given moment of time.

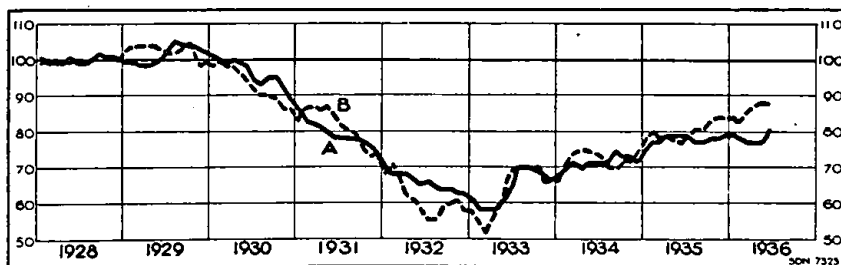
30. The effects of the depression on adequacy of nutrition are not easy to determine. The violent shrinkage in the total monetary income in most countries during the recent depression was nowhere reflected in a general reduction of consumption corresponding in degree. One of the characteristic features of the crisis was the disproportionate fall in the prices of agricultural products, including foodstuffs. Hence the power to purchase food was, in most cases, diminished far less than the nominal money income of the community. In fact, an examination of the total national consumption of various foods during the depression years reveals scarcely any evidence of the general impoverishment prevailing. The reduction in food prices, combined with the long-term trend towards an increased consumption of protective foods, tended to counteract and outweigh the effects of reduced money incomes. Moreover, the unprecedented extent of public assistance during the recent depression modified considerably the effects of unemployment on national consumption.

31. The accompanying chart for the United States shows that food prices fell by as much as the money earnings of employed factory workers between 1928 and 1933 (Diagram XII). This situation related, of course, only to workers who were continuously employed during this period.

Diagram III.

FOOD COSTS AND WEEKLY EARNINGS OF INDUSTRIAL WORKERS (1928-1936).

- A Food-cost index (Bureau of Labor Statistics).
- B Weekly earnings index (National Industrial Conference Board).



In some other countries—for instance, in Belgium—the fall in food prices was even considerably greater than the reduction in the earnings of employed workers.¹

32. For Great Britain, an index of wage-earners' purchasing power calculated by Professor Sargant FLORENCE shows an almost continuous rise from 1929 to 1935.² The index ((4) of Table XXIII) is composed of the estimated sum of the incomes of employed and unemployed workers divided by an index of the cost of living. A substitution of the Ministry of Labour food-price index for the general cost-of-living index reveals an even greater rise in wage-earners' food-purchasing power (5). Moreover, a comparison with the movement of the working population (6) disclosed that the food-purchasing power per head also showed a steady upward movement.

Table XXIII.

INDICES OF WORKERS' PURCHASING POWER (GREAT BRITAIN).

Year	Total working-class money income (1)	Cost of living (2)	Retail food prices (3)	General purchasing power (1) ÷ (2) (4)	Food-purchasing power (1) ÷ (3) (5)	Occupied population (employed and unemployed) (6)
1929	100.0	100.0	100.0	100.0	100	100.0
1930	97.8	96.3	94.2	101.5	104	102.3
1931	95.9	90.0	85.1	106.6	113	105.4
1932	92.7	87.8	81.8	105.6	113	105.6
1933	94.0	85.4	77.9	110.0	121	106.6
1934	97.3	86.0	79.2	113.1	123	107.4
1935	100.6	87.2	80.8	115.4	125	108.4

33. These figures suggest that the main incidence of the worst burden of the depression was on the unemployed, farmers and other primary producers. The fact that average national consumption, or even the average consumption of wage-earners, suffered no decline during the recent depression does not imply

¹ Cf. DUPRIEZ: "Salaires, prix et consommation dans la conjoncture économique de la Belgique depuis 1920"; Beiträge zur Konjunkturlehre. Institut für Konjunkturforschung, Hamburg, 1936.

² "Index of Working-class Purchasing Power", *Journal of Political Economy*, October 1936.

that the depression was without its deleterious effects on the state of nutrition. The maintenance of the plane of living of those who remained in employment was counterbalanced by the sharp fall in the incomes of those who became unemployed; and the fall in food prices, which enabled consumers to maintain consumption standards in spite of falling money incomes, meant serious deprivation for farmers, whose purchasing power was reduced and who were compelled to sell a larger proportion of their output in order to obtain their necessary fixed money requirements, and could thus retain smaller quantities for their own consumption.

34. The effects of unemployment on nutrition in Austria and in Czechoslovakia are indicated by the following tables. The considerable fall in butter, fruit and vegetable consumption should be particularly noted.

Table XXIV.

ANNUAL CONSUMPTION PER CONSUMPTION UNIT^a OF EMPLOYED
AND UNEMPLOYED WORKERS' FAMILIES IN VIENNA (1934).^b

Food	Sixty-nine families (including the nineteen unemployed families)	Nineteen families (unemployed)	Ratio of second column to first %
Black bread	kg. 80.25	92.41	+ 15.2
Pastry, etc.	kg. 15.72	7.37	— 53.1
Whole milk	litre 148.17	94.32	— 36.3
Skimmed milk	litre 8.75	17.19	+ 96.5
Cheese	kg. 3.21	2.80	— 12.8
Butter	kg. 3.90	2.06	— 47.2
Margarine and vegetable fats . .	kg. 2.82	2.24	— 20.6
Lard (melted)	kg. 2.27	4.10	+ 80.6
Lard (unmelted)	kg. 13.71	10.45	— 23.8
Meat other than horsemeat . . .	kg. 41.01	26.16	— 36.2
Horsemeat	kg. 0.68	1.91	+ 181.0
Fish	kg. 1.59	0.62	— 61.0
Eggs	Number 189	116	— 38.6
Vegetables	kg. 48.57	40.35	— 16.9
Potatoes	kg. 55.67	59.35	+ 6.6
Fruit	kg. 48.27	30.69	— 36.4

^a Scale 1.

^b *Wirtschaftsstatistisches Jahrbuch*, 1936, page 292.

Table XXV.

FOOD CONSUMPTION PER CONSUMPTION UNIT^a OF THIRTEEN CZECHOSLOVAK FAMILIES DURING PERIODS OF EMPLOYMENT AND UNEMPLOYMENT.^b

Food	During employment, February 1931	During unemployment, February 1932	Ratio of second column to first %
Meat kg.	2.32	2.58	+ 11.2
Poultry kg.	0.23	—	— 100.0
Butter kg.	0.36	0.30	— 16.6
Pork fat kg.	0.71	0.66	— 7.0
Lard kg.	0.05	0.10	+ 100.0
Artificial fats kg.	0.43	0.35	— 18.6
Milk litres	14.28	13.83	— 3.2
Eggs number	12.22	15.03	+ 23.0
Flour, etc. kg.	5.09	4.89	— 3.9
Potatoes kg.	10.32	9.99	— 3.2
Sugar kg.	2.25	2.31	+ 2.7

^a Scale c.

^b From Dr. KOLLAR, Dr. REZNY and Dr. NECASOVA-POUBOVA: "Der Einfluss der Krise auf Familien beschäftigungsloser Arbeiter in der Tschechoslowakischen Republik", Table 13. Prague, 1933.

A deterioration in the quality of diets has been seen to accompany an increasing period of unemployment. The table given below shows the daily consumption per consumption unit¹ of proteins, fats and carbohydrates by families of Czechoslovak workers who had been unemployed for one to three months, four to twelve months, and over a year, respectively, in February 1932.²

Table XXVI.

EFFECT OF DURATION OF UNEMPLOYMENT TO NUTRITION (CZECHOSLOVAKIA).

	Period of unemployment		
	1-3 months	4-12 months	over 1 year
Protein:			
Animal grammes	41	33	25
Vegetable grammes	44	47	44
Total grammes	85	80	70
Fat grammes	93	85	62
Carbohydrates grammes	497	514	476

¹ Scale c.

² From "Der Einfluss der Krise auf Familien beschäftigungsloser Arbeiter in der Tschechoslowakischen Republik", Prague, 1933.

Particularly striking is the drastic reduction in fat consumption and in the consumption of animal protein; the latter is especially harmful in the case of children.

35. A study was made by the United States Children's Bureau in the autumn of 1934 of the effects of the depression on 259 families in five selected cities¹: 87% of the families were found to be living on reduced incomes (unemployment or wage cuts): 49% were living on half or less than half of previous income; and 73% were living on three-quarters or less.

"Nearly every family that had suffered reduction in income mentioned the cutting-down of diets as one of the greatest hardships they had had to endure. The quantity and quality of meat had been lessened, eggs had been cut out and margarine had been substituted for butter; but the more serious deprivations seemed to be in the matter of fruits, vegetables and milk.

"Enquiry as to the amount and kind of fruits and vegetables used during the week prior to the study showed that in 61% of the families there was a lack of sufficient vegetables containing essential diet elements. In 20% of the families, the diet was almost totally deficient in respect to green vegetables and fruit, the chief articles of diet in these families being bread, beans and potatoes, with possibly cabbage once or twice a week, but no other green vegetables and no fruit. A still higher percentage of inadequate diets was found among the eighty-nine families that were on relief at the time of the study, 79% of this group lacking some of the essentials in fruits and vegetables, as compared with 52% of those not on relief. In 26% of the relief families and 17% of the non-relief families, the diet was almost entirely lacking in these respects.

"Fifteen per cent of the families on relief at time of interview and 6% of those not on relief bought no milk, fresh or canned, during the previous week: canned milk only was used by 25% of the relief families and by 13% of the non-relief families."²

36. An investigation conducted by the Municipal Bureau of Statistics of Amsterdam³ enables a comparison to be made between the diets and living conditions of families of employed and unemployed workers in Amsterdam during the five months October 1934-February 1935. The families concerned were similar as regards composition, the occupation of the head of the family and the districts, and even streets, in which they lived. While the

¹ H. F. LENROOT: "Children of the Depression", *Social Service Review*, June 1935.

² *Op. cit.*, page 226.

³ *Statistische Mededeelingen van het Bureau van Statistiek der Gemeente Amsterdam*, No. 105. Amsterdam, 1937.

average, at \$400. The cost of an adequate diet was no doubt less for farm families; but 25% of all farm families in the United States in 1929 consumed food valued at only \$250 per family, and it seems unlikely that they could have obtained a physiologically satisfactory diet.

The United States Bureau of Labour Statistics is at present engaged on a study of the distribution by income in 1936 of all families (including husband and wife) in certain towns of the United States. The Works Progress Administration has prepared an estimate of the cost of a maintenance budget for a family of four, for which the food costs were based on the Bureau of Home Economics adequate diet at minimum cost. The following table shows the percentage of white and negro families with incomes too low to purchase the Works Progress Administration maintenance budget:

Table XXVIII.

Town	Percentage of families (including husband and wife) with annual incomes in 1935/36 less than required to purchase Works Progress Administration maintenance budget		Average annual cost of maintenance budget (four persons) \$
	White families	Negro families	
Butte, Mont.	35.4	—	1,283.69
Chicago, Ill.	37.0	—	1,352.35 ^a
Columbia, S.C.	28.5	90.7	1,187.70
Columbus, O.	29.2	78.4	1,174.61 ^a
Denver, Colo.	41.0	—	1,242.23
Mobile, Ala.	38.8	92.3	1,125.07
Omaha, Nebr.	38.5	—	1,253.97
Portland, Ore.	39.8	—	1,217.97
Providence, R.I.	43.2	—	1,242.01
Atlanta, Ga.	34.4	89.6	1,263.68

^a Including sales tax where levied.

It is clear that more than a third of the white families, and almost all of the negro families, in most of these towns had incomes in 1936 insufficient to secure the Works Progress Administration maintenance budget.

An attempt has been made by Mr. Colin CLARK¹ to give a rough estimate of the distribution of the incomes available per head of

¹ "National Income and Outlay." London, 1937.

the population of the United Kingdom. The following table summarises his results:

Table XXIX.

DISTRIBUTION OF POPULATION ACCORDING TO WEEKLY INCOME PER HEAD
(UNITED KINGDOM).

Income per head per week	All persons %	Children under 14 %
Up to 10s.	13.7	25.3
10s.-15s.	16.9	26.7
15s.-20s.	16.5	20.2
20s.-30s.	25.3	19.0
30s.-40s.	19.4	7.3
Over 45s.	8.1	1.5

According to Sir John ORR,¹ those with an income of under 10s. per week per head spent an average of 4s. per week on food, while the next group, with an income of 10s.-15s. per head per week, spent on the average 6s. per week on food. These figures may be compared with the costs of the British Medical Association standard diet, valued at July 1936 prices and adjusted to meet the recommendations regarding milk of the Technical Commission of the Health Committee of the League of Nations:²

Table XXX.

COST OF STANDARD DIETS FOR PERSONS OF DIFFERENT AGES
(UNITED KINGDOM).

Age	Male	Female
Over 70	4s. 1d.	4s. 1d.
14-70	6s. 9d.	5s. 9d.
6-14	5s. 5d.	5s. 5d.
Under 6	3s. 10d.	3s. 10d.

It is impossible to make a direct comparison between the figures relating to the distribution of the population according to expenditure per head and those relating to costs of standard diets which differentiate according to age and sex. A rough indication of the adequacy of funds available for family living, and therefore for

¹ "Food, Health and Income." London, 1936.

² R. F. GEORGE: "A New Calculation of the Poverty Line", *Journal of the Royal Statistical Society*, 1937, Part I.

food expenditure, may be obtained by taking the cost of an adequate diet for a typical family consisting of a married couple, one child aged 6-14 and one child under 6, and comparing it with actual incomes and expenditure on food according to the estimates of M. CLARK. A standard diet for such a family would cost 21s. 9d. per week; whereas, from Mr. CLARK's figures, it appears that families of this composition in the lowest income group devote only 16s. per week to food, and cannot therefore obtain a diet of the British Medical Association standard (adjusted). Families and individuals spending at this level are estimated to constitute 13.7% of the population of the United Kingdom.

It may be sufficient to cite these estimates relating to the United States and the United Kingdom, where the general level of national income is relatively high, to indicate the importance of the distribution of income for the question of nutrition, and to suggest the even greater importance which it may have in relatively poorer countries.

40. A number of different measures has been applied for the purpose of raising or supplementing the incomes of those in the lower-income groups.

The various methods of regulating wage incomes—free collective bargaining, official recognition of the results of collective bargaining, their compulsory extension to workers in other spheres, the fixing of minimum wage rates for public authorities, for private industry and particularly for home work, family allowances, etc.—are discussed at length in several reports of the International Labour Office.¹ Such measures have undoubtedly contributed towards improving the levels of consumption of employed labour; the standards of living at which they aim, however, seldom take into specific account the essential requirements laid down by nutritional experts, and are generally based rather on existing levels of consumption or wage rates, which may be far from adequate from a nutritional point of view.

In addition to measures designed to raise the incomes of employed labour, considerable progress has been achieved in attempting

¹ Cf. International Labour Office: Studies and Reports—"Workers' Nutrition and Social Policy", Chapter VI (Series B, No. 23); "Minimum-wage-fixing Machinery" (Series D, No. 17); "Family Allowances" (Series D, No. 13).

to secure a certain stability of consumption by those who are unable to find employment, whether for economic or physical reasons. Many countries have established schemes of social insurance to provide against the worst hardships of unemployment; sickness, invalidity, old age, etc. As in the case of minimum-wage-fixing, however, insufficient account seems to be taken in general of nutritional requirements in the fixing of benefits to be paid under these schemes. "As a rule, social-insurance cash benefits are very modest. It could hardly be argued that they were fixed, in any countries, by taking genuine account of the costs of a minimum standard of living. The amounts of benefits paid in various countries represent a compromise between the maximum financial obligations it was not desired to exceed and the actual benefits it would have been desirable to give. Thus it cannot be maintained, as a general proposition, that the cash benefits payable under social-insurance plans provide sufficient and rational nutrition for insured workers and their families." ¹

Other more positive measures for improving incomes of unemployed workers have been applied through the various methods of employment creation introduced in most countries during the recent economic depression; public works, employment and other forms of subsidies, tax remissions, cheap money policies, etc. In so far as such measures have helped to stimulate general economic activity, they have not only contributed to raise the incomes of those for whom additional employment was provided, but have at the same time increased the national income as a whole.

Finally, the various forms of social provision of essential foods to particularly exposed sections of the population may also be regarded as measures designed to attack directly the problem of low incomes in relation to malnutrition. Where such measures are practicable, as in the case of the distribution of milk to pregnant and nursing mothers and the provision of milk or meals for school-children in schools, they form a particularly effective method of coping with the danger of malnutrition.

¹ International Labour Office: "Workers' Nutrition and Social Policy", page 128

Chapter 6.

THE RELATION OF EDUCATION TO NUTRITION.

A. INTRODUCTORY.

1. In the preceding chapter, it has been shown that income plays an important part in determining the nutritional adequacy of diets. It is, however, obvious that income is not the only influence. The connection between money expenditure and the level of nutrition is not a rigid one; there is an infinite number of ways of spending a given sum of money on food, and clearly some distributions of expenditure will give better results, from a nutritional standpoint, than others. This means, in short, that through publicity and education it is possible to influence habits of food consumption and induce consumers to distribute their food expenditure in a way which will secure for them a diet more adequate in essential nutritive properties than that which they now obtain with the same money outlay. Indeed, as has been shown in Part III, Chapter 1, education and propaganda have already exercised a profound and beneficial influence on food habits in many countries.

2. Current discussions of nutritional problems frequently tend to stress either income or education as the main determinant of the state of nutrition, and to minimise the rôle of the factor which is not stressed. These two factors, however, are not alternatives, but joint determinants, though it is, of course, obvious that income will prove the more important factor to those with most restricted means, while education is important for all sections of the community.

B. SCOPE FOR INFLUENCING CONSUMPTION THROUGH EDUCATION.

3. To ascertain the general nature of the relation between expenditure on food and the quality of the diet purchased, it was sufficient to observe the relationship between average food expenditure in successive income groups and the corresponding average

consumption of various foods. In order to determine the scope for influences on consumption other than income, the same budgetary material can be used, but, in this case, attention must be concentrated, not on the average food consumption of the various income groups, but on the differences in the consumption of individual families *within* any given income group. If these differences are considerable, then it is obvious that the relationship between income and consumption is not rigid and that it is therefore possible to exert an effective influence on consumption through education or propaganda without touching incomes. If, on the other hand, differences in the consumption of individual families within an income group are not great, consumption standards may be assumed to be directly dependent on expenditure, and the possibility of consumption being influenced by purely educational means is inconsiderable.

4. Some interesting studies illuminating the point have been made by the Bureau of Home Economics in the United States. Actual diets purchased by nearly 900 families living at different levels of expenditure on food were classified as A, B or C diets,¹ and the distribution of A, B and C diets corresponding to these different levels were found to be as follows:

Table I.
QUALITY OF DIETS AT DIFFERENT LEVELS OF FOOD EXPENDITURE
IN THE UNITED STATES. ^a

Weekly food expenditure per food cost unit ^b	Percentage of records	Percentage of diets classed as:		
		A	B	C
\$1.33-\$1.99	37	4	35	61
\$2.67-\$3.32	51	35	59	6
\$4.00-\$4.66	12	77	20	3

^a From Hazel STIEBELING: "Diets of Families of Employed Wage-earners and Low-salaried Clerical Workers living in Industrial Communities in Three Regions of the United States, 1934-1936". Bureau of Home Economics, Washington, February 1937.

^b "Food cost units" are based on the relative cost of adequate diets for individuals of different ages and sexes. Bureau of Home Economics scale. See footnote, page 253, Part III, Chapter 5.

¹ An A diet is one which meets average minimum requirements with a wide margin of safety in all respects; it furnishes, per adult consumption (nutrition) unit (see footnote, page 253, Part III, Chapter 5), 68 grammes or more of protein, 0.68 gramme or more of calcium, 1.32 grammes or more of phosphorus, and 0.015 gramme or more of iron per day. A B diet is one which meets average minimum requirements in all respects with an uncertain margin of safety; it provides, per

[Continued on following page.]

It is obvious that, as the level of food expenditure per head increases, there is a tendency for the quality of the diets to improve. In the lowest expenditure group, as many as 61% of the diets are classed as unsatisfactory; but, since 35% of those spending a similar amount on food managed to secure a class B diet, it may be concluded that no very exceptional skill or conditions were required for obtaining adequate nutrition at that food-expenditure level. In other words, if the 61% in the C class were to learn how the 35% in the B class distributed their food expenditure, they could presumably obtain an adequate diet, even without any increase in income. The fact that only 4% of diets in the lowest income group reached the A standard suggests that rather exceptional housekeeping skill was required; it is probable, however, that, if they were once let into the secret, at least some of those attaining only B diets might be enabled to reach the A level by education in domestic economy and the principles of nutrition. In the next two income groups, there seems no reason why all could not be instructed sufficiently to enable them to reach the A standard; in any case, the fact that 6% and 3% respectively are found in the C class in the two upper income groups can clearly be accounted for only by ignorance, and not by limitation of economic means.

5. A similar analysis was applied to farm families, 544 records extending over the period 1917-1932 being used and adjusted to allow for changes in prices.¹ Seven income groups were considered; in the lowest, the annual *per caput* money value of food was under \$32, while in the highest it ranged from \$193 to \$226. Here, none of the lowest group (which comprised only 2% of all records) obtained a grade A diet, and less than 10% obtained grade B, which suggests that, at least among this section of the farming population, malnutrition could be accounted for almost exclusively on economic grounds. The proportion of C diets decreases as

[Continuation of footnote from preceding page.]

nutrition unit, 45 grammes or more of protein, 0.45 gramme or more of calcium, 0.88 gramme or more of phosphorus, and 0.01 gramme or more of iron. Finally, a C diet is one which fails in one or more respects to meet minimum average requirements—*i.e.*, it provides for one or more of the nutrients mentioned less than the amounts specified for diet B.

¹ U.S. Department of Agriculture: Agricultural Outlook Charts—"Farm Family Living and Summaries". (Washington, 1936.)

incomes rise, but a certain number of inadequate diets are to be found even in the fourth group, whose food was valued at between \$97 and \$129 per head per year; over half of this group secured A diets. Clearly, education might help to improve these few C diets, since expenditure was sufficient to procure A diets without any abnormal managing skill. The same fact applies to the B diets in the top three income ranges, where over 70% of the families in each case managed to reach the A standard.

6. The nutritive composition of the diets of families within the same food-expenditure group also varies widely. Table II, on the next two pages, shows an analysis of diets of seventy-three families divided into three such food-expenditure groups.

Adequate allowances of the various nutrients recommended by the Bureau of Home Economics are appended to indicate the degree to which these requirements are met in the different income groups. It will be seen that, even in the lowest income group, where insufficiency is found in most nutrients, there are some diets which attain the required standards (except in the case of calcium); while in the second group, where adequacy is reached in a considerable proportion of cases, there are still some cases of insufficiency in respect of each nutrient (cases of inadequate calcium intake appear even in the highest class). These deviations again suggest that considerable improvement could be effected by educational methods.

7. An analysis of a recent Swedish investigation into family living¹ reveals similar evidence of the scope for nutritional education. Although the average intake of various nutrients and of calories increased with increasing income, considerable dispersion was found in each income class, the dispersion in each class being about as great (measured by the coefficient of variation²) as was found for the whole population. Moreover, the relatively satisfactory level of the mean intake of most nutrients even in the lowest income class examined suggested that at least the greater part of the inadequate diets was to be explained by lack of skill in management and ignorance rather than by inadequate income.

¹ Ernst ABRAMSON: "Preliminary Report on the Composition of Swedish Diets." Stockholm, 1937 (mimeographed).

² Coefficient of variation = $\frac{\text{standard deviation}}{\text{mean}}$.

Table II.

DISTRIBUTION OF FOOD RECORDS, BY NUTRITIVE CONTENT PER NUTRITION UNIT ^a PER DAY, WINTER DIETS, 1934/35, IN NORTH ATLANTIC REGION ^b (FAMILIES OF EMPLOYED WAGE-EARNERS AND CLERICAL WORKERS).

Suggested requirements	Item	Number of records from families whose weekly <i>per capita</i> food expenditure was:			Total
		\$1.20-\$1.80	\$2.38-\$3.00	\$3.57-\$4.17	
Energy value:					
3,300	Under 2,400 calories	9	0	0	9
	2,400-2,699	7	1	0	8
	2,700-3,299	2	10	1	13
	3,300-3,599	3	6	3	12
	3,600 calories and over	2	19	10	31
Protein:					
70	Under 45 grammes.	2	0	0	2
	45-69 grammes	13	2	0	15
	70-99 grammes	8	26	1	35
	100-119 grammes	0	8	4	12
	120 grammes and over	0	0	9	9
Calcium:					
0.68	Under 0.30 gramme	3	0	0	3
	0.30-0.44 gramme	13	5	0	18
	0.45-0.69 gramme	7	15	3	25
	0.70-0.99 gramme	0	15	7	22
	1 gramme and over	0	1	4	5
Phosphorus:					
1.32	Under 0.88 gramme	6	0	0	6
	0.88-1.31 gramme	14	10	0	24
	1.32-2 grammes	3	24	8	35
	2 grammes and over	0	2	6	8
Iron:					
0.15	Under 0.01 gramme	5	0	0	5
	0.01-0.0149 gramme	14	14	0	28
	0.015-0.0199 gramme	4	15	4	23
	0.02 gramme and over	0	7	10	17

^a Bureau of Home Economics scales of relative nutritional requirements. See footnote, page 235, Part III, Chapter 5.

^b "Nutritive Value of Diets of Families of Wage-earners and Clerical Workers in North Atlantic Cities, 1934/35", *Monthly Labor Review*, July 1936.

Table II (continued).

Suggested requirements	Item	Number of records from families whose weekly <i>per capita</i> food expenditure was:			Total
		\$1.20-\$1.80	\$2.38-\$3.00	\$3.57-\$4.17	
Vitamin A:					
	Under 3,000 International units ^a	5	0	0	5
	3,000-5,500 International units	8	15	0	23
4,000-5,500	5,500-11,000 Internat. units .	7	17	8	32
	11,000 International units and over	3	4	6	13
Vitamin B (B₁):					
	Under 70 International units ^a	2	0	0	2
	70-125 International units .	15	6	0	21
125-200	125-200 International units .	3	17	1	21
	200-250 International units .	3	11	4	18
	250 International units and over	0	2	9	11
Vitamin C:					
	Under 500 International units ^a	2	0	0	2
	500-750 International units .	6	1	0	7
700-1,000	750-1,000 International units	9	4	0	13
	1,000-1,500 Internat. units .	5	15	2	22
	1,500 International units and over	1	16	12	29
Vitamin G (B₂):					
	Under 300 Sherman units .	1	0	0	1
	300-499 Sherman units . . .	12	4	0	16
500-750	500-749 Sherman units . . .	10	22	1	33
	750-999 Sherman units . . .	0	8	9	17
	1,000 Sherman units and over	0	2	4	6

^a The data relating to vitamins A, B₁ and C in the above table have been roughly converted from Sherman into International units by means of conversion coefficients computed by Dr. Harriette Chick and given in footnote c on page 253. The suggested requirements and classifications in the original table were as follows:

Suggested requirements:

3,000-4,000	Vitamin A: Under 2,000 Sherman units 2,000-3,999 Sherman units 4,000-7,999 Sherman units 8,000 Sherman units and over.
500-750	Vitamin B (B₁): Under 300 Sherman units 300-499 Sherman units 500-749 Sherman units 750-999 Sherman units 1,000 Sherman units and over.
75-100	Vitamin C: Under 50 Sherman units 50-74 Sherman units 75-99 Sherman units 100-149 Sherman units 150 Sherman units and over.

The frequencies then remain the same.

The following analysis of the vitamin content of diets at three income-levels shows that, although the sub-standard percentage decreased with increasing income, even in the lowest group, a large proportion of the sample secured an adequate intake; and the mean intake of each vitamin was above the standard, suggesting that by skilful education it should not be hard to eliminate the sub-standard percentages altogether.

Table III.

VITAMIN INTAKE IN DIFFERENT INCOME GROUPS (SWEDEN).

Income group:	1,500-3,000 crowns				3,000-5,000 crowns				5,000 crowns and over			
Vitamin:	A	B ₁	B ₂	C	A	B ₁	B ₂	C	A	B ₁	B ₂	C
Mean <i>a</i> intake	4,131	328	684	58	4,374	320	658	61	5,017	308	658	67
Percentage below standard <i>b</i>	43	32	39	21	32	36	47	16	12	44	47	8

a The mean values for the different income groups have been rendered comparable by standardising the populations in regard to distribution of different family types.
b The following standards were employed:

Vitamin	
A	4,000 International units
B ₁	300 International units
B ₂	650 Sherman-Bourquin units
C	50 milligrammes of ascorbic acid.

8. The fact that the above examples have been taken from countries with relatively high planes of living must not be taken to imply that scope for education does not exist also in poorer communities.

Confirmation of the thesis that nutritional education can play an important part in determining health standards was provided by an investigation into "Poverty, Nutrition and Growth" among slum children in Scotland, published in 1926.¹ Here, the factor of "maternal efficiency" was found to be more closely correlated to the nutritional condition of the children than income (per person), air-space (a measure of overcrowding) or the health of the mother. A significant correlation was found between maternal efficiency and physique of children from 1 to 4 years in Glasgow, Edinburgh and Dundee. It was supposed that the other factors, such as housing conditions, the size of the family and the health of the mother, although not directly related to the

¹ Medical Research Council: Special Report No. 101—"Poverty, Nutrition and Growth." 1926.

nutritional state of the children, probably exercised an indirect effect through their influence on the maternal efficiency factor. Maternal efficiency cannot be exactly defined; but the very close agreement found among the various investigators taking part in the study appeared to justify a statistical classification of mothers as either good and efficient with houses and children well cared for, or bad and inefficient with children and houses badly cared for. The quality of "maternal efficiency" thus determined would seem to be an element susceptible to considerable improvement by educational means.

9. An attempt has been made in Czechoslovakia to show the possibility of improving the quality of workmen's diets without increasing total expenditure on food, and taking into account, as far as possible, existing food habits and preferences.¹ The actual food consumption recorded² by ten workmen's families (each containing five members) in 1930/31 was taken as the basis. The diet was found to be adequate as regards calories, but deficient in proteins and with a low mineral and vitamin content. The changes proposed consisted chiefly of substantial increases in the consumption of milk and milk products and of fruit and vegetables; to compensate for these increases in cost and quantity, it was suggested that some more expensive cuts of meat should be replaced by cheaper ones and by fish; fat and sugar consumption should be reduced, flour to some extent replaced by potatoes, and alcohol entirely eliminated. Table IV, on the following page, shows the principal changes recommended.

The cost of the recommended diet was calculated to be about the same as that of the original. The authors of the study conclude that, "for the sum actually spent on food, the worker could procure a physiologically satisfactory diet", and that it is the task of popular health education to provide him with the knowledge required to achieve this.

10. The importance of education and its power to contribute towards the solution of the nutrition problem is naturally greater

¹ M. ČAKRTOVA, H. PELC, M. PODZIMKOVÁ-RIEGLOVÁ: "Essai pour l'établissement d'un type de régime alimentaire pour une famille ouvrière." *Les Travaux de l'Institut d'Hygiène de l'Etat*, No. 3. (Prague, 1936.)

² State Statistical Bureau enquiry into family living.

Table IV.

COMPARISON OF ACTUAL AND RECOMMENDED DIETS AT EQUAL COST
(CZECHOSLOVAKIA).

Food	Quantities (kg.)		Difference	
	Actual	Recommended	Kg.	%
Meat	94.90	88.66	— 6.24	— 6.6
Eggs	22.56	22.56	0.00	0.0
Fish	4.00	10.81	+ 6.81	+ 170.3
Total	121.46	122.03	+ 0.57	+ 0.5
Milk	446.50	853.11	+ 406.61	+ 91.1
Sour milk (<i>Caillebotte</i>) . . .	5.38	22.45	+ 17.07	+ 317.3
Cheese	5.38	5.85	+ 0.47	+ 8.7
Total	457.26	881.41	+ 424.15	+ 92.8
Fats	67.53	60.65	— 6.88	— 10.2
All animal foods	646.25	1,064.09	+ 417.84	+ 64.7
Cereals	20.47	25.12	+ 4.65	+ 22.7
Flour	199.70	178.51	— 21.19	— 10.6
Flour products, bread, etc. . .	338.34	338.34	0.00	0.0
Total	558.51	541.97	— 16.54	— 3.0
Cabbage	93.16	147.64	+ 54.48	+ 58.5
Fruits (fresh and preserved) . .	63.45	117.63	+ 54.18	+ 85.4
Potatoes	320.00	353.83	+ 33.83	+ 10.6
Legumes	4.50	7.52	+ 3.02	+ 67.1
Total	481.11	626.62	+ 145.51	+ 30.2
Sugar and sweets	120.55	102.15	— 18.40	— 15.3
Spices	36.83	34.97	— 1.86	— 5.1
Alcoholic drinks	128.81	0.00	— 128.81	— 100.0
All vegetable foods	1,325.81	1,305.71	— 20.10	— 1.5
All foods	1,972.06	2,369.80	+ 397.74	+ 20.2

in the higher-income ranges. Education can mitigate the evil among lower-income groups, but not remove it. Thus the corrected diet of the Czechoslovak worker cannot be obtained by those whose incomes do not suffice for the original diet. It was estimated that only 20% of the workers in the country, or 40% of those who were in a position to marry (the figure for Prague was judged to be higher—60 to 70%),¹ could support a family of five members at that level.

Table V.

ESTIMATED ANNUAL *per Caput* CONSUMPTION OF VARIOUS FOODS IN DIFFERENT COUNTRIES (AVERAGE 1930-1934) ^a.

	Milk and cream	Butter	Meat	Eggs	Imported citrus fruits (1934)
	Litres	Kg.	Kg.	Number	Kg.
Austria	200 ^b	2.8 ^b	—	98	4.0
Belgium	79	9.4	41	236	9.2
Czechoslovakia	155	—	33	115	2.7
Denmark	164	8.0	62	111	3.7
Finland	—	—	27	41	—
France	105	6.0	34	149	8.4
Germany	107	7.4	51	129	5.1
Italy	34	1.1	16	119	—
Netherlands	117	7.4	46	134	7.5
Norway	—	—	33	124	7.7
Poland	—	—	19	110	0.5
Roumania	—	—	—	110 ^d	0.7
Sweden	—	—	36	110	6.0
Switzerland	263	6.5	47	157	9.1
United Kingdom	95 ^c	10.0	64	172	13.1
Canada	—	13.9	65	285	—
United States	146	8.1	62	199	—
Australia	100	13.4	91	—	—
New Zealand	128	17.7	104	240	—

^a League of Nations: "The Problem of Nutrition", Vol. IV — "Statistics of Food Production, Consumption and Prices", documentation prepared by the International Institute of Agriculture (Geneva, 1936), revised. Data given in pounds in the original; converted into kilogrammes at the rate of 1 lb. = 0.4536 kg.
^b 1934. ^c 1930. ^d 1933.

II. Not only as between different income groups in one country, but also as between different countries, the scope for effective nutritional education varies. The results of educational campaigns

¹ *Op. cit.*, page 19, note.

by themselves are likely to be most satisfactory in countries where the general plane of living is fairly high. Education is, of course, of great importance in poorer countries also, but it is possible to improve the state of nutrition by educational means only within the limits set by the prevailing levels of national income and its distribution—limits which, in poor countries, may be far below those nutritionally desirable.

12. Even in countries of more or less similar planes of living, however, striking differences are to be found in the *per caput* consumption of many of the important foodstuffs (see Table V). This suggests the existence of considerable scope for improvement of national health standards through nutritional education as well as through changes in prices.

Attention has already been drawn, for instance, to the relatively low milk consumption in Great Britain compared with that of other countries on roughly similar planes of living; clearly, this country should be able to afford a higher rate of milk consumption if made fully aware of the nutritional advantages involved. In the same way, the butter consumption of some of the important dairying countries seems remarkably low; in some cases, moreover, it is accompanied by a high margarine consumption, suggesting an insufficient realisation of the superior nutritive value of butter.

C. MEASURES FOR SPREADING INFORMATION ON RATIONAL NUTRITION

13. A great deal of progress has already been made in most parts of the world in the dissemination among the public of a knowledge of the correct principles of nutrition.

14. Detailed information on the various measures adopted in different countries has already been presented by the Mixed Committee in Volume III of its interim report.¹ A number of different methods is there disclosed, corresponding to some extent to the differences in social, political and economic organisation and the particular nutritional problems of the individual countries.

¹ League of Nations: "The Problem of Nutrition", Vol. III—"Nutrition in Various Countries", 1936.

The organs responsible for the spread of nutritional information vary from country to country. In some, the State plays the main rôle; in others, voluntary or private commercial organisations are more active. The national branches of the Red Cross have prepared exhibitions, arranged lecture courses and published pamphlets in a number of countries. Women's institutes also have organised conferences and arranged for demonstrations and lectures on cooking and food values in the local branches. Co-operative organisations have published articles and books on various questions related to popular nutrition.

In addition to such educational campaigns based mainly on nutritional considerations, propaganda for the consumption of particular foodstuffs has been carried out by producers' organisations and marketing boards. In the case of "milk weeks", "egg weeks", "fish weeks", or the promotion of the consumption of fruit and vegetables, the nutritional arguments run entirely in line with the economic interests of producers. In other cases, the encouragement of consumption for commercial reasons may not receive so ready a blessing from the nutritionist experts. It is clear that an understanding among the general public of the principles of rational feeding is necessary in order to enable it to distinguish "true" from "false" nutritional propaganda.

15. Systematic education in the principles of sound feeding must be carried out within the framework of the given administrative and educational system. A primary necessity is the education in nutritional questions of public health authorities, and particularly those responsible for the administration of relief. Another essential step is the education of all mothers, more especially those who are pregnant or nursing, on the best diets for themselves and their children. Such instruction is being given in a great many countries through infant welfare centres and followed up by further advice through health visitors in the homes.

General education in the preparation and marketing of food is provided in most countries in the domestic science lessons for girls in elementary and secondary schools. The value of these lessons depends largely on the nature of the instruction in the principles of nutrition given to the teachers themselves during their period of training. Increasing attention is being devoted to this important pivot of general nutrition education. Additional

possibilities are offered by evening classes and adult schools where lectures on cookery and dietetics are normally provided. It is important that such instruction should emphasise the importance of the correct preparation as well as the correct selection of foods.

16. In addition to the instruction of the housewife of the present or future, particular importance attaches to the nutritional education of those responsible for collective feeding—in schools, in institutions, and in the army and navy. Growing attention has already been devoted to nutrition in these fields in most countries, and steps are even being taken to instruct hotel and restaurant managers in the newer knowledge of nutrition.

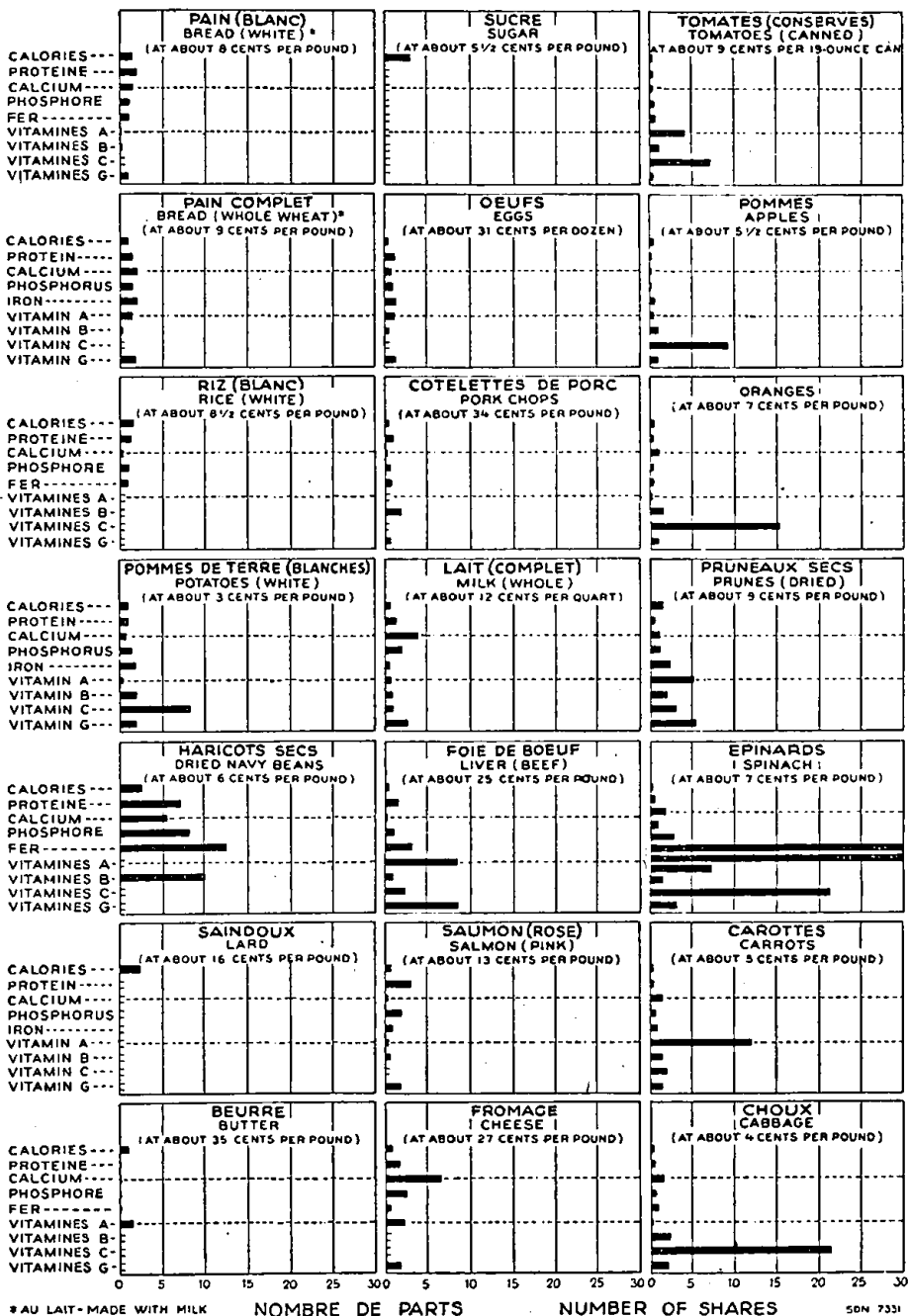
17. The main channels for spreading information to the general public have been special pamphlets, articles in the daily Press and in technical or popular periodicals, broadcast talks (which are of special use in reaching scattered populations), lantern lectures, film strips and, in some cases, the distribution free or at reduced prices of important foods such as milk, with a view to increasing their popularity and establishing the habit of their consumption.

18. Especially useful are suggestions for various diets providing all necessary nutritive elements and calculated to fit different expenditure levels. An interesting type of popular nutritional education by means of diagrams may be cited from the United States. Diagram I is part of a series of diagrams prepared by the Bureau of Home Economics of the Department of Agriculture showing roughly how 1 cent's worth of different foods compare in essential nutrients. The quantities of the various nutrients obtained for 1 cent (at July 1936 prices) are expressed in shares of the total requirements of the nutrient in question for a normal adult male (thirty such shares make up total requirements for twenty-four hours). The diagram is given merely as an example of an effective form of popular nutritional education, and not as scientifically accurate general information. It is, in fact, impossible for such a diagram to give more than a very rough and general guide, owing to the wide variations in the nutritive content of particular foods according to quality, condition of freshness, whether raw or cooked, the method of preparation, the parts actually consumed. The value of the diagram lies in its attempt to translate abstract technical nutritive requirements into concrete

Diagram I.

HOW A CENT'S WORTH OF DIFFERENT FOODS COMPARE IN ESSENTIAL NUTRIENTS.

(UNITED STATES, JULY 1936.)



* AU LAIT - MADE WITH MILK

NOMBRE DE PARTS

NUMBER OF SHARES

quantities of familiar foods at current prices, so as to give a practical guide to housewives with restricted means in the purchase of inexpensive nutritive diets.

19. Instruction is sometimes given as to the best method of adjusting diets to the seasonal changes in relative prices and in available foods or to special emergencies, so that the maximum nutritive value for the minimum cost may always be obtained. Further, detailed information is furnished in some countries on methods of supplementing diets or reducing their cost through home garden produce and home preservation of various foods. It is essential that national nutrition authorities should adapt the general nutritional information provided to the situation in the various regions of the country—both as regards the particular foods available, the relative prices of the alternative sources of the same nutrients and the level of income of the population concerned. Where imported foods are not easily accessible, the best substitutes from a nutritional point of view should be indicated.

20. Detailed accounts of the effect on nutrition of education measures actually adopted are, unfortunately, scarce. The report by a nutritionist on three years' work in a rural community of New York State may, however, be cited by way of example.¹ An enquiry was made in 1927 among ninety-three families whose diets had been surveyed at the beginning of an educational campaign in 1924, and in almost all cases an improvement was noted. Twenty-two families reported an increased use of milk, and forty-eight that they had been using more vegetables of various kinds; thirty-eight increased the use of green vegetables and fifty-three were eating more raw vegetables. Many families living on farms had been stimulated to plant gardens and provide themselves with an abundant supply of green vegetables. Instruction had been given in the storing of green vegetables for winter use, and this practice was found to have spread considerably. Forty-eight families reported that they ate more fruit; forty-seven, more tomatoes; thirty-five, more whole-grain cereals; fifty, more whole-grain bread; and thirty-three, more eggs. At the same time, forty-one families reported a decline in meat consumption.

¹ Ruby McODELL: "Improving the Dietary Habits of a Rural Community." (Milbank Memorial Fund, New York, 1929.)

The improvement in health following these dietary changes was recognised by the families themselves.

There had been no special nutrition education of individual families, and an attempt was made to find which part of the general nutrition programme had been the most effective in bringing about the changes registered during the three years of the campaign. Forty-nine families attributed the changes to the lectures organised by the Home Bureau; thirty-two said that the influence had come through the instruction received by the children in the schools; and thirty-four attributed the main influence to the public health nurses.

An interesting feature brought out by this enquiry was the changes in the types of goods kept in the country food stores which followed the increased demand for protective foods. "Local stores, in order to supply the insistent demand for certain essential foods, were forced to add to their regular stock such things as green vegetables, fruit and whole-grain cereals, which in the past many of them had supplied erratically or not at all." As a result of a talk on the nutritive value of the cabbage, a merchant in one community sold a carload of cabbages in a week, whereas that quantity had normally lasted him one month.

21. It would be of great use for future organisers of campaigns of nutritional education if they could have more such data on the effects of past efforts, and particularly on the methods of education which had been found to yield the best results.

Chapter 7.

EVIDENCE OF MALNUTRITION IN CERTAIN COUNTRIES

1. In previous chapters of this report, two conflicting sets of tendencies have been revealed, one of which (the general rise in national incomes, and particularly real labour incomes, the spread of knowledge regarding correct principles of nutrition and scientific progress in agriculture) has made for a marked improvement in nutrition, while the other (the persistence, in many parts, of poverty, ignorance and factors artificially raising food prices) has prevented the improvement from going so far as could be wished. The net result of these conflicting tendencies in the different countries is the level of nutrition as it exists to-day. It would be desirable to give at this point a description of the prevailing level of nutrition in different parts of the world, in order to illustrate the real scope and significance of the present problem of malnutrition.

2. Unfortunately, with the information at present available, it is impossible to do so. Statistics of the average national consumption of various foods, based on figures of production and trade, would be misleading for this purpose, as they conceal the differences—which the preceding chapters have shown to be wide—between the food consumption of the various income and social groups. A great many studies of the food-consumption habits and nutritional standards of particular groups of individuals and families have been made, but the number of individuals and families included in the sample is generally so small, and drawn from so restricted an area or population group, that it would be extremely dangerous to generalise on the results of these studies. Moreover, different norms have been used by different investigators in assessing the nutritional status of the population groups they have examined, so that any international comparison is, at the present time, out of the question, and even national studies must be treated with extreme caution.

The paucity of the information available is to be deplored, as it is obvious that an accurate knowledge of the facts must form the basis of a sound nutrition policy. At the present stage of the movement towards better nutrition, the collection of information on food consumption habits and nutritional standards is a fundamental and pressing need. Within the past year, two groups of experts, meeting under the auspices of the League of Nations, have made important contributions in this field. One group, which met at Geneva in December 1936 to consider methods of assessing the state of nutrition of children and young people, decided to recommend three types of enquiries applicable to different requirements. Discussion of the question of the methods appropriate to general surveys of the food-consumption habits of a nation as a whole occupied a considerable part of the time of the representatives of national Nutrition Committees who met at Geneva in February 1937. It is to be hoped that use will be made of the results of these various discussions by public and private authorities and that the information at present available regarding food-consumption habits and nutritional status will become progressively more complete and reliable.

3. For the present, it is therefore necessary to limit this exposition to a few examples of the nutritional situation, drawn from different parts of the world. It is necessary to emphasise that the paragraphs which follow do not purport to give a comprehensive picture, but merely to show that the problem of malnutrition is a real one and that it exists in countries of the most diverse social structure and stage of economic development.

United States of America and Western Europe.

4. In the United States, Sweden and the United Kingdom, attempts have been made during the past two years to study and analyse in detail the food-consumption habits of large and representative groups of the population. As it happens, these are all countries where the general plane of living is relatively high.¹

¹ It is hardly necessary to substantiate this statement, but substantiation can be found in the figures of *per caput* consumption of different foods published in League of Nations: "The Problem of Nutrition," Vol. IV—"Statistics of Food, Production, Consumption and Prices". (Geneva, 1936.)

5. Records of food consumption of a very large number of families have recently been collected by the United States Bureau of Labor Statistics for the purpose of revising cost of food indices. A preliminary analysis of the content, nutritional adequacy and economy of a selection of these diets has been made by the Bureau of Home Economics. When the analysis of the material collected by the Bureau of Labor Statistics is completed and when the results of the study of consumer purchases (co-operatively undertaken by the Bureau of Home Economics, Bureau of Labor Statistics, National Resources Committee and Works Progress Administration) are available, it will be possible to assess with a high degree of accuracy the adequacy of diets in the United States as a whole. The preliminary material already published throws, however, a considerable amount of light on the food habits and nutritional state of the population groups to which it relates.

Records relating to the food expenditure (at various periods from 1934 to 1936) of 2,746 families of wage-earners and clerical workers living in four different sections¹ of the country showed the following percentage distribution of food expenditure per person per year:²

Table I.

DISTRIBUTION OF FAMILIES ACCORDING TO ANNUAL FOOD EXPENDITURE PER HEAD
(UNITED STATES).

	Food expenditure per person per year	Percentage distribution of the 2,746 families
1.	Under \$32	0
2.	\$32-\$65	2
3.	\$65-\$97	14
4.	\$97-\$129	28
5.	\$129-\$161	25
6.	\$161-\$193	15
7.	\$193-\$226	8
8.	\$226-\$258	4
9.	\$258-\$290	2
10.	\$290 and over	2

100

¹ New England, Middle Atlantic, East South Central (white families and negro families) and Pacific.

² Adjusted to March-May 1935 price-levels. See Hazel K. STIEBELING: "Food Consumption of Urban and Village Families at Different Levels of Food Expenditure" in *Journal of Home Economics*, January 1937.

Table II.

DISTRIBUTION OF 897 DIETARY RECORDS ACCORDING TO GRADE OF DIET BY LEVEL OF EXPENSE FOR FOOD, REGION AND COLOUR OF FAMILY (UNITED STATES).

Level of expense for food, region, and colour of family	Number of records	Percentage of diets classified as:			
		Grade A	Grade B	Grade C	
1. Families spending \$1.33 to \$1.99 per food cost unit ^a per week for food (group 3 of Table I):					
North Atlantic, white	117	2	37	61	
Pacific, white	21	10	33	57	
East South Central {	white	114	6	35	59
	negro	83	4	31	65
Total or average	335	4	35	61	
2. Families spending \$2.67 to \$3.32 per head cost unit per week for food (group 5 of Table I):					
North Atlantic, white	253	27	65	8	
Pacific, white	132	39	57	4	
East South Central {	white	53	55	43	2
	negro	18	55	28	17
Total or average	456	35	59	6	
3. Families spending \$4.00 to \$4.66 per food cost unit per week for food (group 7 of Table I):					
North Atlantic, white	69	77	19	4	
Pacific, white	37	78	22	0	
Total or average	106	77	20	3	
4. Groups 1, 2 and 3 above combined:					
North Atlantic, white	439	28	50	22	
Pacific, white	190	44	47	9	
East South Central {	white	167	22	38	40
	negro	101	13	31	57
Total or average {	white	796	31	47	22
	negro	101	13	31	57
All families covered	897	29	45	26	

^a See footnote b page 253. Adjusted to 1935 retail food prices.

One-sixth of the families included in this sample were spending less than \$97 per head per year for food. Of this sixth of the population covered, it is remarked that "families spending at these low levels are very likely to have diets deficient in one or more nutritive factors; in fact, about two-thirds of those spending between \$65 and \$97 *per capita* per year for food had diets which failed to meet average 'minimum requirements' in one or more respects".¹ Nearly 30% spent between \$97 and \$129 per head per year for food; "the diets of most of these families tend to meet average requirements, but have an uncertain margin for safety". The families spending more than \$129 per head per year could, with careful selection and preparation of food, obtain a fully adequate diet; but it was found that only half of the group spending from \$193 to \$226 per head "had diets providing a generous margin of safety in all nutritional essentials".

6. The nutritive content of the diets of 897 families falling in level-of-food-expense groups 3, 5 and 7 of Table I, was analysed. The distribution of the dietary records according to grade of diet, by level of expense for food, region and colour of family is shown in Table II on the preceding page.²

The last line of this table shows that, of the 897 families, 29% had grade A diets, 45% grade B diets and 26% grade C diets.³ In other words, nearly three-quarters of the observed population had diets which are regarded as falling short of the optimum: their intake of one or more essential nutrients fell below the standard considered necessary for health and efficiency or failed to provide the requisite "margin of safety".

Nearly 90% of the observed negro population had diets classified as B or C; for the white population, the percentage was almost 70. A higher proportion of the population of the Pacific region obtained A diets than of the North Atlantic or East South Central regions. This is partly due to the fact that more of the observed families of the Pacific region fell in the higher level-of-expense-for-food

¹ *Ibid.*, page 10.

² From an unpublished study by Hazel K. STIEBELING: "Diets of Families of Wage-earners and Low-salaried Clerical Workers living in Industrial Communities in Three Regions of the United States, 1934-1936." (Mimeographed, Washington, February 1937.) Reproduced by courtesy of the author.

³ For the precise definition of the nutritive contents of the three grades of diet, see first footnote on page 281.

groups; it may also be due in part to lower food prices. It will be observed that within any given region and level-of-expense-for-food group there is a wide distribution in the character of the diet obtained by different families.

7. Analyses of the material collected by the Bureau of Labor Statistics on food-consumption habits of non-urban families have not yet been published. The Bureau of Home Economics has, however, recently analysed the results of a number of studies made by different investigators between 1917 and 1932.¹ The *per caput* money value of the food consumed² by the 544 families covered in the different studies was adjusted to 1935 price-levels to render them roughly comparable. The percentage distribution of the records according to level of money value of food per head and type of diet obtained is shown below:

Table III.

DISTRIBUTION OF FARM FAMILY DIETS ACCORDING TO GRADE OF DIET, BY VALUE OF FOOD (UNITED STATES).

	Annual money value of food per head	Percentage of records	Percentage distribution by grade of diet		
			A	B	C
1.	Under \$32	2	0	9	91
2.	\$32-\$65	17	4	50	46
3.	\$65-\$97	34	26	56	18
4.	\$97-\$129	30	55	41	4
5.	\$129-\$161	12	74	26	0
6.	\$161-\$193	4	90	10	0
7.	\$193-\$226	1	87	13	0

On account of the methods used, the results are, of course, less reliable than those quoted in the previous paragraph for industrial workers. They suggest, however, that the incidence of malnutrition is at least as great in rural as in urban communities; in both cases, an appreciable fraction of the population is, for one reason or another, failing to secure a diet deemed adequate for health and efficiency.

8. Assessments of the nutritional status of children in the United States made at various periods in recent decades have

¹ U.S. Department of Agriculture: Agricultural Outlook Charts, 1937—"Farm Family Living and Summaries." (Washington, November 1936.)

² Food produced and consumed on the farm was valued at *wholesale* prices prevailing in the nearest market.

revealed a considerable degree of malnutrition. It must, however, be emphasised that the standards used are not uniform in the different studies, and in some cases the classification is largely based upon the personal appreciation of the investigator. The examples which follow are quoted merely with a view to demonstrating the existence of malnutrition, and cannot be taken as necessarily reflecting accurately its extent.

In a summary¹ of thirteen investigations, each involving thousands of children, carried out between 1906 and 1924, the average percentage suffering from malnutrition on the basis of clinical examination was judged to be 22.3. In seventeen investigations carried out during 1918-1924, weight in relation to height was used as a criterion of nutritional status, and 32.7% were judged to be malnourished. In a clinical examination of several hundred New York school-children made in 1933, the nutrition of more than a third of the children was rated as "poor" or "very poor".² Investigators have found a high prevalence of rickets among children; writing in 1921, HESS and UNGER said that "fully three-fourths of the infants in the great cities, such as New York, show rachitic signs of some degree".³

Of the deficiency diseases attacking adults, pellagra is to be found in the United States. Nearly 7,000 deaths from this disease were recorded in 1928, or 6.1 per 100,000 inhabitants. By 1933, the number of deaths had fallen to less than 4,000, or 3.1 per 100,000 inhabitants. Pellagra is practically confined to the Southern States, where maize is the staple cereal; in 1930, the pellagra death rate in North Carolina, South Carolina, Georgia, Alabama, Mississippi and Arkansas was 29.4 per 100,000 inhabitants.

9. An analysis has recently been made of the nutritional content and adequacy of the diets of Swedish wage-earners, low-salaried employees and members of the "middle class".⁴ The original data on food consumption were obtained in connection with the

¹ ROBERTS: "Nutrition Work with Children" (1927).

² KISER and STIX: "Nutrition and the Depression" in *Quarterly Bulletin of the Milbank Memorial Fund*, October 1933.

³ See BURNET and AYKROYD: "Nutrition and Public Health", in *Quarterly Bulletin of the Health Organisation of the League of Nations*, June 1935.

⁴ ERNST ABRAMSON: "Preliminary Report on the Composition of Swedish Diets." Stockholm, 1937 (mimeographed).

Social Board's investigation of living conditions and household habits made in 1933; they relate to the year November 1932–November 1933. Of the household records thus made available, 1,245 were analysed on behalf of the Swedish National Nutrition Committee. The average calorie value of the diets was found to exceed 3,500 calories; their average protein content was about 100 grammes, the fat content 140 grammes and the carbohydrate content 425 grammes. Average calcium content was over 1 gramme per day, phosphorus content around 1.85 grammes and iron content 17 milligrammes. There were, however, wide differences in the consumption of different income and family-type groups and considerable deviations in the value of the individual diets within each homogeneous group. A detailed analysis was made of the material to determine how large a proportion of the various population groups failed to secure adequate intake of various nutrients. The results are shown below:

Table IV.

PERCENTAGE OF DIETARIES BELOW STANDARD IN RESPECT
TO THE SPECIFIED NUTRIENTS (SWEDEN).

	Protein %	Calories %	Calcium %	Phosphorus %	Iron %
All families	3.1	15.4	2.1	4.6	23.0
Workers.	2.9	12.7	2.2	2.9	22.1
Salaried employees	2.9	16.1	2.7	4.4	23.3
Middle class	3.4	17.1	2.0	4.0	24.8
Middle part of Sweden (Svealand) .	2.4	13.3	1.9	3.4	22.1
Southern part of Sweden (Norra Götaland)	2.4	15.4	1.5	2.7	27.1
Southernmost part of Sweden (Södra Götaland)	4.3	17.1	5.2	4.7	18.9
Northern part of Sweden (Norrland)	3.3	14.9	1.0	2.7	23.9

The standards of adequacy adopted are 3,000 calories per consumption unit per day, 70 grammes of protein, 0.68 grammes of calcium, 1.32 grammes of phosphorus and 15 milligrammes of iron. It will be observed that 15% of the observed population failed to secure this standard of calorie intake and nearly a quarter of the population failed to secure the "norm" of iron intake. Further calculations showed that 27% of all the dietaries were deficient in vitamin A (4,000 International units was taken as standard),

36% were deficient in vitamin B₁ (300 International units) and as many as 43% were deficient in vitamin B₂ (650 Sherman-Bourquin units), while 14% were deficient in vitamin C (50 milligrammes of ascorbic acid taken as standard).

10. During the years 1929-1931, an extensive social-hygienic investigation was carried out in certain parts of Sweden in an attempt to discover the relationship between diet and the high incidence of certain diseases (gastric and intestinal disturbances, anæmia, etc.) among the agricultural population of the coast district of the north of Sweden.¹ Their isolation and difficulties in disposing of their products render the diet of this population monotonous and lacto-cereal, with herring used largely as a condiment. Vegetables and fruit are scarcely eaten; wood-berries are available, but they are eaten only to a limited extent and hardly ever preserved for winter use. The investigation showed that there was an intimate connection between the one-sided structure of the diet and the diseases referred to, and that the incidence of these diseases was very much less among the forest workers of the same region, whose diet includes pork, reindeer meat, sausage, game and fish, as well as milk and potatoes.

11. In Norway, periodic measurements have been made of the weight and height of school-children of different social groups. The following table shows the figures concerning children 14 years old at different periods:

Table V.

HEIGHT AND WEIGHT OF SCHOOL-CHILDREN AT STATE
AND PRIVATE SCHOOLS (NORWAY).

	State schools				Private schools			
	Boys		Girls		Boys		Girls	
	Height Cm.	Weight Kg.	Height Cm.	Weight Kg.	Height Cm.	Weight Kg.	Height Cm.	Weight Kg.
1920 . .	148.2	38.5	150.6	41.8	153.5	42.4	154.9	44.9
1925 . .	150.5	40.0	152.4	42.4	155.9	43.8	155.9	45.9
1930 . .	153.1	42.6	154.9	45.5	157.4	45.5	158.5	48.2
1935 . .	155.0	43.6	157.3	47.3	162.7	50.0	161.2	50.1

¹ Martin ODIN: "Certain Kinds of Diet in connection with Diseases among Various Groups of Population in Various Parts of Sweden", *Acta Medica Scandinavica* (Upsala, 1934).

Two points in this table are of great interest. One is the steady increase in the height and weight of school-children in Norway in 1935: this is unquestionably connected with the improvement in food-consumption habits to which reference has been made in Part III, Chapter 1. The second point of interest is the considerable difference which exists between the heights and weights of children of the same age but of different income groups. This may also be mainly attributed to the difference in their food consumption.

12. For the United Kingdom, the most comprehensive survey of the state of nutrition available is that made by Sir John Boyd ORR and his colleagues in 1936.¹ The data used were collected by the Market Supply Committee² and have been accepted by the Advisory Committee on Nutrition of the Ministry of Health as substantially correct. They were based upon 1,152 dietary records collected by various investigators between 1932 and 1935. "They include an undue proportion of families in the industrial north, of families with small incomes and relatively large numbers of dependants. Moreover, they were not distributed seasonally throughout the year, but tended to be concentrated in the spring and early summer months . . . the actual quantities and values of the different items in the family dietary would no doubt be somewhat altered if a collection of family budgets thoroughly representative of the whole country were available."³

A series of estimates was made of the distribution of the whole population according to income and food expenditure per head; and these estimates were used in conjunction with the dietary records of the observed families falling within the different level-of-food-expenditure groups to form the basis of a generalised picture of the nutritional state of the population as a whole. The conclusions reached in this way were that the average diet of the 10% of the population with lowest incomes was "inadequate for perfect health in all the constituents considered";⁴ that the diet of the next

¹ J. B. ORR: "Food, Health and Income." (London, 1936.)

² Published in the *Journal of Proceedings of the Agricultural Economics Society*.

³ J. B. ORR: "Food, Health and Income", pages 61-62.

⁴ Standards adopted for a "moderately active man" were 3,000 calories, 67 grammes of protein, 0.68 gramme of calcium, 1.2 grammes of phosphorus, 15 milligrammes of iron, 5,600 International units (= about 4,000 Sherman units) of vitamin A and 1,000 International units (= about 100 Sherman units) of vitamin C per day.

poorest 20% was "adequate only in total proteins and total fat"; that the next 20% had a diet "adequate in energy value, protein and fat, but below standard in minerals and vitamins"; that the next 20% were "adequate in iron, phosphorus and vitamins, but probably below standard in calcium"; that the next 20% "had an ample margin of safety in everything with the possible exception of calcium"; and that in the 10% of the population with highest incomes, the standard requirements were exceeded in every case.

13. The same study records the height of males of the same age in different social groups, and considerable differences are disclosed. "These differences in height are in accordance with what would be expected from an examination of the diets in common use in these classes. In the lower-income groups, the diet is relatively deficient in the constituents" required for growth. Too high a proportion of the diet consists of carbohydrate rich foods, which contain very little bone- and flesh-forming material".¹ Experiments carried out in Scotland in 1927 with a view to determining the effect of supplementing the diet of school-children with milk showed that the rate of growth of those receiving additional milk was about 20% greater than in those not receiving additional milk. "The increased rate of growth was accompanied by a noticeable improvement in health and vigour".² With regard to the incidence of diseases known to be connected with diet, it is stated that rickets has "markedly decreased in recent years". On the other hand, "about 80% of the deciduous teeth of British children are imperfectly developed. Since this defect may be established before birth, it may in part be due to dietary deficiency in pregnancy. But the fact that the incisors, which are in the most advanced state of development at birth, are usually better calcified than the later-developed molars suggests that the dietary deficiency may be even greater in early childhood than before birth".³

The Advisory Committee on Nutrition for Great Britain wrote in its first report, published in the spring of 1937:

"Although much has been achieved, much still remains to be done before the general health and physique of the population reach the optimum level. It must

¹ *Op. cit.*, page 41.

² *Op. cit.*, pages 47-48.

³ *Op. cit.*, page 42.

not, for example, be overlooked that, in 1935, tuberculosis was still responsible for 32,903 deaths (England, Scotland and Wales), 6.1% of the total mortality, or that the mortality rate from all causes in children aged 1 to 4 years, favourable as is its trend, is distinctly higher than that of certain other countries, notably Norway, Sweden and the Netherlands. Moreover, the numerous milk feeding experiments which have been carried out demonstrate how physique in childhood might be improved. There is thus ample room for further progress, and we believe that the improvements in diet referred to will play an important part in attaining this end."

Union of South Africa and Australia.

14. In South Africa, a recent Government report¹ contained the following comments on the diets of European families in certain urban areas:

"It is unlikely that many cases go short of calories. The proportions of protein, fat and carbohydrate are within what are generally considered to be normal limits. . . . The intake of minerals gives no cause for alarm, except in the case of calcium in the lower-income groups. . . . Values of the order of 0.5 gramme per day show a real poverty of this element that cannot be satisfactory, especially as the average family contains several children who have a special need of calcium. For pregnant and lactating women, this amount is grossly inadequate. A monotonous diet, such as that of poorer groups, is very liable to serious deficiencies: deficiencies of a mineral constituent, a vitamin or an amino-acid, or, more probably, a subtle combination of several deficiencies, no one of which would be very serious by itself; deficiencies which produce a subnormal condition rather than a recognisable pathological state; deficiencies which are not revealed by an analysis of the diet into its constituents or by any other theoretical consideration of the items in the diet. . . ."

"The position regarding the consumption of milk is highly unsatisfactory. It is to be deplored that there should be such a falling-off of money spent on milk from the richer to the poorer classes. More than half the families in the poorer groups never see milk—families containing several children who have a special need of milk. It is very unlikely that many of these families are escaping from serious nutrition deficiencies."

15. An Advisory Council on Nutrition was established in Australia in February 1936 and presented its first report² in September of that year. On the general state of nutrition of the

¹ "Report on the Enquiry into the Expenditure of European Families in Certain Urban Areas, 1936." Union of South Africa, Office of Census and Statistics. Pretoria, 1937.

² League of Nations Mixed Committee on the Problem of Nutrition, document 59, September 4th, 1936. Reply to C.L.202.1935.

population, the Council reported that “no evidence is available . . . of any general or gross under-nourishment of the population. To this general statement, however, certain exceptions must be made. It is known that in some of the capital cities rickets exists amongst the children. . . . Evidence of an indefinite nature was placed before your Council that ‘pre-scorbutic’ conditions are to be found amongst the children of the remote interior districts of the continent, where vital food elements are not available. It is known that in certain localities, which are restricted in area and few in number, goitre occurs as an endemic disease... Some evidence of an inconclusive character was before your Council pointing to the possibility of some calcium deficiency in the diet of the people of the Brisbane area; and some phosphorus (or calcium) deficiency in the diet of the residents of Western Queensland (and perhaps also of other interior districts of Australia) ”.

In regard to the consumption of certain individual articles of food, the Council reported: “It is undeniable that the people of Australia are not consuming as much *milk* as would be physiologically beneficial. This applies with especial force in the case of infants, children, pregnant women and nursing mothers.” *Meat* consumption was reported to be high. Attention was drawn to a disquieting feature—“a deeply-rooted prejudice in Australia against the eating of internal organs—brains, heart, liver, kidney and sweetbreads. These contain special food factors which render them specially valuable as foods”. A similar prejudice against all cheaper cuts of meat was reported and deplored.

In regard to *fruit and vegetables*, the Council stated that “the present cost very gravely restricts their consumption as food over a considerable portion of the Commonwealth”. In the case of *bread*, the Council expressed its deep concern at the “low level of quality reached by much of the bread made in Australia”, and its opinion that “wheat flour is not now being so used that the maximum food value or even the maximum æsthetic value is being obtained from it”. The Council advised that “the use of lightly milled cereals and of potatoes should be increased. An extension in the use of the latter should be made at the expense of sugar as a source of carbohydrates”. The Council declared that the consumption both of fish and eggs could and should be much extended.

Some evidence regarding nutritional diseases in Melbourne may be derived from a report on an examination of 1,009 pre-school children in 1936. The Emerson height-weight standard was taken as an approximate guide to the state of nutrition. In 1934 and 1935, 26.4 and 25 % respectively of all the children showed evidence of malnutrition in that they were 7 % or more below the Emerson standard. It was stated in the report on the examination: " Many of the children are definitely stunted and, although the weight is enough for their small height, they are obviously undersized. One is justified in believing that, with better diet and hygienic conditions, more light, air and good food, the average of these Australian children would be higher.

" The lack of balance, in the diet, due perhaps to the practice of appeasing the hunger of growing children with excess of carbohydrate, is another disquieting feature. The pale, puffy, even slightly overweight child, with continual catarrh, colds and chronic bronchitis, came to be such a familiar type that it could be recognised as it came through the door.

" The increasing evidence of malnutrition with age is very marked. At 2 years of age, 16 % were under weight, at 3 years 18 %, at 4 years 23 %, and at 5 years 43 % were malnourished."

The incidence of dental caries at different ages among the pre-school children examined was as follows:

Table VI.

CARIES AT DIFFERENT AGES AMONG PRE-SCHOOL CHILDREN
(MELBOURNE, AUSTRALIA).

Age	Percentage of children with carious teeth
2-3 years	14
3-4 years	33
4-5 years	55
5-6 years	76

" In regard to rickets, 3 % of the children presented definite cases, and another 15 % showed such signs as knock-knees, bossy foreheads, depressed or malformed chests, prominent abdomens.

" Many children, by the pallor of their skins and mucous membranes, appeared to be anæmic. Of eighty children who were

regarded as definitely anæmic, thirty were also under weight and regarded as malnourished. Seven were over weight, but not therefore well nourished, as in many of these cases one found a protein deficiency and carbohydrate excess in the diet."

Central and Eastern Europe.

16. The examples of the preceding paragraphs, drawn as they are from countries where the general plane of living is high, leave no possible doubt that, even in the most advanced countries of Western civilisation, a serious problem of malnutrition exists. In countries with lower general income-levels, it is likely that the evil is even more widespread. In the agricultural regions of Central and Eastern Europe, where farming is largely on a subsistence basis, the peasant eats what he cultivates himself; and very often he cultivates mainly one or two cereals and/or potatoes and cabbage or beans and pays little or no attention to those additional cultures which would supplement his intake of minerals and vitamins. Frequently, the consumption of meat in peasant households is restricted to one pig per year, which is slaughtered at Christmas. Natural conditions sometimes set rigid limits to the crops which can be produced, but in some cases these conditions are favourable to production of a type which would relieve the monotony of the diet and supply essential nutrients at present lacking. The low level of agricultural technique (connected in part with the lack of capital) and, in some cases, the excessive parcellation of the land and high or increasing population density are important factors militating against better nutrition. Another factor worthy of mention is the disproportion which frequently exists between the prices which the peasant receives for the products he sells and the price he must pay for his modest purchases of industrial goods.

17. Very little exact information is available regarding the nutritional status of the population of Central and Eastern Europe, and conditions vary so much from one region to another that it would be extremely dangerous to generalise on the basis of fragmentary data. There is, however, enough information to make it clear that, paradoxical though it appears, a serious problem of malnutrition (in some cases, perhaps, even under-nutrition) exists among a section of the population of Central and

Eastern Europe engaged in food production. A few examples will be sufficient to establish this fact. Thus, in the so-called "passive" regions of Yugoslavia (which include 2½ million people), the land is too unfertile to feed the large number of people on it;¹ the yield of wheat and maize is low, the breed of live-stock is poor and the relatively small quantities of fruit grown are generally sold to provide the cash required for essential industrial goods and taxes. The exact nutritional status of the inhabitants of these regions has not been analysed, but the results of recruiting are stated to indicate the inadequacy of nutrition; tuberculosis is widespread.

18. A detailed analysis was made of the diets of twenty-two peasant families living in Osoî, a village in Moldavia (Roumania), during the winter and spring of 1933/34 and 1934/35. These families represented different economic levels, but seventeen of the twenty-two contained members who suffered from pellagra in 1933, and, in three others, cases had been recorded during 1931/32.²

The following table gives the average daily consumption per consumption unit³ of various foods during five different periods of the year. The periods are as follows:

Period

1. Pre-Christmas fast, (November 30th-December 24th, 1933).
2. Post-Christmas time (December 25th, 1933-February 18th, 1934).
3. Lent (February 19th-March 28th, 1934).
4. Post-Easter time (April 8th-June 8th, 1934).
5. St. Peter's fast (June 4th-June 21st, 1934).

Diet varied considerably as between fasting and non-fasting periods. During the seven weeks' Lenten fast and the six weeks' pre-Christmas fast no animal food is allowed, and during Passion Week vegetable fats, such as olive oil, are also forbidden. Children under 10 do not normally observe these fasts, and, in fact, usually consume more milk, butter and eggs during these periods, since there is more available for them. The diet during periods 4 and 5 was supplemented by the addition of whole wheat (*cf.* greatly increased consumption of brown bread).

¹ See League of Nations: "The Problem of Nutrition", Vol. III. (Geneva, 1936.)

² W. AYKROYD, I. ALEXA and J. NITZULESCU "Study of the Alimentation of Peasants in the Pellagra Area of Moldavia (Roumania)", *Archives roumaines de pathologie expérimentale et de microbiologie*. (Paris, December 1935.)

³ See footnote, page 243, scale *k*.

Table VII.

PRINCIPAL FOODS CONSUMED AT FIVE DIFFERENT PERIODS BY TWENTY-TWO FAMILIES IN OSOI (MOLDAVIA, ROUMANIA).

(In grammes per International consumption unit ^a per day.)

	Period 1	Period 2	Period 3	Period 4	Period 5
Whole yellow maize	762	645	773	276	350
Refined wheat flour	40.	79	53.5	60	8.9
Bread (brown)	43	39	25.2	745	760
Bread (white)	9	7.8	6.9	4	5
Rice	16	10	5.5	6.1	6
Milk (whole)	11	16	19.2	179	217
Buttermilk and sour skimmed milk	5.1	9.9	7.5	52.4	63.2
Cream and butter	—	1.3	0.5	5.1	8.9
Cheese	0.7	15	1	20.4	30.8
Eggs	0.5	7.9	6.6	40	12.7
Meat (all kinds)	34.1	93.9	13.4	68.9	57.2
Beans (dry)	86	25	86.9	19	15
Beans (string)	—	—	—	0.27	16.6
Potatoes and root vegetables .	59	21.3	54.2	13.9	0.22
Green vegetables, <i>Sauerkraut</i> , pickles	78.5	71	112.2	33.5	32.1
Onions	12	9.6	17.3	2.9	0.02
Dried fruits	21	3.7	5.7	0.14	—
Fresh fruits	0.8	0.3	0.1	27.4	220
Lard and bacon	0.03	15	1.7	14.8	2.8
Olive oil	10	0.4	8.4	4.6	3.6
Sugar	1.6	3.4	3.0	9.7	1.3

^a See footnote, page 241, scale *k*.

The nutritional content of these diets is shown in the following table:

Table VIII.

ANALYSIS OF DIETS OF TWENTY-TWO PEASANT FAMILIES IN OSOI (ROUMANIA).

Average daily intake of:	Period 1	Period 2	Period 3	Period 4	Period 5
Calories per International consumption unit	3,941	3,657	3,886	3,995	4,090
Proteins per Hawley consumption unit ^a . . . grammes	86	83.6	85.65	102.4	105

^a Hawley scale for protein and mineral requirements:

Child under 6	0.8
Child 6-9	1.0
Girl 10-12	1.2
Girl 13-14	1.3
Boy 10-14	1.3
Girl 15-17	1.2
Youth 15-17	1.0
Woman 18-60	0.8
Man 18-60	1.0

Table VIII (continued)

Average daily intake of:	Period 1	Period 2	Period 3	Period 4	Period 5
Fats per International consumption unit grammes	45	63.8	49.5	69	58.1
Carbohydrates grammes	726	613.6	717.2	698.2	739
Calcium per Hawley consumption unit grammes	0.28	0.34	0.28	1.03	1.195
Phosphates grammes	2.24	1.93	2.18	2.06	2.27
Iron grammes	0.025	0.0197	0.024	0.0193	0.0215
Percentage of calories from maize	74.27	68.8	74.9	25.36	30.2
Percentage of proteins from maize	67.91	60.77	67.45	20.23	24.95
Percentage of animal proteins	4.03	20.18	3.02	19	18

From this table, it appears that the calorie content of the diets was adequate in all seasons; the protein intake was sufficient in quantity but inadequate in quality, particularly during fasting periods; fat intake was low and carbohydrate intake very high; calcium consumption was well below standard (0.68 grammes, according to Sherman), except during the period where home-produced milk and cheese were available and where supplementary wheat was administered; the phosphate and iron contents were adequate in all periods—the latter mainly owing to the consumption of beans. As regards vitamins, the main deficiency is in vitamin B₂. (The lack of vitamin D in the diet appears to be compensated by the outdoor life.) The diet of periods 1-3 is said to be "probably a typical pellagra-producing diet, resembling in its general composition the diets consumed throughout the pellagrous districts of Roumania and other pellagrous districts in Eastern and Northern Europe, Southern Russia and Egypt. The most striking feature is its high percentage of maize. In general, the habitual diet of the families studied is deficient in vitamin B₂ and calcium and in protein of high biological value. Intake of protective foods—*e.g.*, milk and green vegetables—is small".¹

A study² recently made of the consumption during one year of fifty families of the village of Dragus, in Transylvania (Roumania),

¹ *Op. cit.*, page 422.

² D. C. GEORGESCO, of the Central Institute of Statistics: "Considérations sur l'alimentation paysanne en Roumanie" in "Mélanges"; D. GUSTI: *Archives pour la Science et la Réforme Sociales* (Bucharest, 1936).

estimated the average daily consumption per "consumption unit" at 4,344 calories, 121 grammes of protein, 82 grammes of fat and 781 grammes of carbohydrate. These figures are not based upon direct observation, but are estimated on the basis of amounts of foods produced, fed to animals, purchased, etc. It was found upon analysis that 83% of the total calorie consumption was derived from foods of vegetable origin (43% from maize and 32% from wheat and rye) and only 17% from meat, milk, butter, eggs and other foods of animal origin. Of the proteins, 78% were found to be of vegetable origin and 22% of animal origin. The consumption of milk is stated to be relatively high in the village in comparison with other regions, but the author concludes that "it is beyond dispute that the nutrition of the peasant population studied is qualitatively inadequate from the point of view of protein content and quantitatively inadequate from the point of view of fat content". A similar study carried out in the village of Cornova, in Bessarabia, showed that consumption of animal protein was only 17% of the total (97 grammes per head per day).

Pellagra is found in the parts of Roumania where maize is the chief article of diet. According to AYKROYD,¹ some 5 to 6% of the population of the villages of Moldavia which he visited in 1933 suffer from pellagra every spring. Figures supplied by the Roumanian public health authorities show the following mortality from pellagra during the years 1930-1933:

Table IX.

DEATH RATE FROM PELLAGRA IN ROUMANIA.

Year	Deaths from pellagra	Death rate per 100,000 inhabitants
1930	2,087	11.7
1931	2,075	11.4
1932	1,964	10.7
1933	2,800	15.0

In the opinion of BURNET and AYKROYD, "these figures certainly represent an understatement, for many deaths actually due to pellagra which first invalidated the patient are ascribed to terminal causes".

¹ See BURNET and AYKROYD: *op. cit.*

19. It is stated¹ regarding the nutritional position in Hungary that "the diet of the Hungarian agricultural worker is quantitatively and qualitatively far below requirements for work". The staple food is bread, flour dishes, dried beets and beans, potatoes, cabbage, bacon, very rarely beef or mutton and occasionally pork for those who can afford it. "There is hardly any consumption of milk, eggs, poultry, butter, green vegetables, fruit (except water-melons) and sugar". The diet as a whole is characterised as "rich in vegetable proteins and carbohydrates, but poor in animal proteins, in vitamins A, C and D and in minerals". The only difference in the diet of the very poor and the better-off peasants is said to be the use of more fat and meat by the better-off. Rickets, dental caries and latent hypovitaminosis are stated to be prevalent; and the excessive consumption of carbohydrates is said to lead frequently to gastro-enteritic disturbances. A study of the diet of day-labourers in Budapest made by the same author in 1934 resulted in the conclusion that it was similar to that of the agricultural labourers and "equally inadequate". -

20. Observations made in certain rural areas of Czechoslovakia have revealed striking deficiencies in the diet. Thus, in Sub-Carpathian Ruthenia, maize is the "traditional and almost exclusive diet of the population".² A study made by the State Institute of Public Health of nutrition in certain agricultural regions of Slovakia found that, though milk was in common and abundant use, its quality "did not satisfy even minimal requirements"; apart from milk, cereals were found to be the main constituent of the diet. Fruit is not eaten to any great extent, and the only vegetable of importance, apart from potatoes, is cabbage. Of the three districts examined in detail, it was found that in Drava the diet was "far from satisfactory from a qualitative point of view"; in Liptov, the diet was "one-sided"; and it was only in Turiec (where more meat, fruit and vegetables were eaten) that the diet was found to be adequate.

21. In parts of Poland, particularly in the east, the food of the peasantry consists almost exclusively of rye and potatoes. The

¹ By Dr. L. SCHEFF-DABIS, Assistant Director of the Metropolitan Health Laboratory, Budapest.

² League of Nations: "The Problem of Nutrition", Vol. III, page 30.

rural population density is extremely high and the results of recruiting are stated to show a high percentage of physically unfit. No comprehensive assessment of the nutritional status of the rural population is available. Certain details are, however, available regarding urban workers. An official investigation¹ of the budgetary accounts of 192 families of industrial workers made in 1927 showed a total calorie intake of 2,856 calories per consumption unit per day, with the intake of the lowest income group less than 2,400 calories. Protein intake was 65.6 grammes, of which 25.4 grammes of animal origin (13 grammes in the case of the lowest income group); fat intake, 53.7 grammes; and carbohydrate intake, 507.9 grammes.

22. The conclusion which must be drawn from the evidence of the preceding paragraphs (fragmentary and incomplete though that evidence is) is distressingly clear. There can be no possible doubt that the problem of malnutrition is a real one and that it calls urgently for solution. In every country for which detailed information is available, it has been found that an appreciable proportion of the population is, for one reason or another, not getting enough of the foods which the modern science of nutrition considers necessary for health and efficiency. In some cases, the deficiencies in the diet have been shown to result in manifest disease. Even where this does not occur, there is reason to believe that millions of people in all parts of the world are not enjoying the degree of health and vigour which could be theirs with proper nourishment. To assess the cost of malnutrition—whether in human terms, through disease and sub-optimal health, or in economic terms, through loss of efficiency and the money spent in attempting to repair the damage done by faulty nutrition—would be an impossible task. The cost is incalculable; and there can be no doubt that, beside it, the cost of the measures which can be taken to improve nutritional standards—through education, through the lowering of food prices, through direct social provision or through other means—would appear insignificantly small.

* * *

¹ Statistique de la Pologne: " Budgets des familles ouvrières, 1927 ". (Warsaw, 1930.)

Asia.

23. The problem of nutrition in Asia falls outside the scope of this study, but it may be of interest to add here a few extracts from the report¹ of the Preparatory Committee of the Intergovernmental Conference of Far-Eastern Countries on Rural Hygiene, which will meet, under the auspices of the Health Organisation of the League of Nations, in Java in August 1937.

“ Investigations into the state of health of the peoples of the East, no matter what their starting-point, lead back invariably to the question of nutrition. . .

“ The prevailing opinion is that the state of nutrition of the populations of rural districts is not wholly satisfactory in any of the Asiatic countries. It is thought that, of the 1,150,000,000 inhabitants of that continent, not less than 75% have a diet below the standards fixed by European science. From various publications, and from the information that the Committee collected during its tour, it appears that a large part of the population is living on the border-line of the minimum requirements, while millions are even below that level.

“ These statements should, however, be accepted with some caution, because an examination of the studies so far made in Asia shows that few accurate statistics are available. . . .

“ Everything produced is always quickly consumed, and, so far from there being a limitation of crops, the dominant question everywhere is how to increase them. An exception may be made as regards a few articles intended for the world market, such as sugar and copra. . . .

“ At present, the suggestions made (with a view to improving nutrition) are too often based merely upon individual enquiries on the spot or observations from Europe, and consequently they frequently prove to be quite wrong or economically impracticable. In Europe and America, for instance, one suggested means of improvement is to increase the consumption of milk, eggs, butter, meat, vegetables and fruit; but, in most Asiatic countries, any considerable developments in regard to the first three items are out of the question. In Asia, therefore, entirely different solutions will have to be sought.

“ Some efforts in this direction have already been made. The soya bean and the foods prepared from it, including soya milk, have been one of the most important subjects of study in recent years. But a local acquaintance with the food problems of the Far East justifies the assumption that big improvements in the composition of the diet can be brought about by other means. . . .

“ Carbohydrates form, throughout Asia, the chief ingredient in the daily fare. So far as they are digestible, they serve exclusively as sources of energy. . . . Although an excess of carbohydrate absorption may not be a bad thing in itself, the quantity of vitamins and mineral substances required by the organism in such circumstances is also apt to be greater. This is important for the study of the beriberi question.

¹ League of Nations, Health Organisation: “ Intergovernmental Conference of Far-Eastern Countries on Rural Hygiene: Report by the Preparatory Committee ” (document C.H.1234—Ser. L.o.N. P. 1937.III.3). Geneva, 1937.

" In the case of most Asiatic peoples, the daily protein intake is very small. Of those proteins, from 80% to 95% are vegetable. It is only in the diet of the relatively prosperous classes that animal proteins predominate . . . the percentage of protein in the food of inhabitants of the tropics ought not to be too large. . . .

" Another question is whether a better grouping of proteins can be obtained by selection of different soils or of particular manures. A great deal can be done for these countries by proper collaboration between the different experts. . . .

" The quantity of fats consumed by the various peoples of the Far East is much smaller than in Europe, and, further, the fat is mainly of vegetable origin.

" In some countries, the proportion of vegetable fat amounts to 95%. A more detailed study of conditions as regards vegetable and animal fats is desirable if the question of nutrition in Asia is to be fully understood. . . .

" Beri-beri, the first known form of vitamin deficiency, is localised mainly in Asia. Now that we know how to prevent it, adequate measures have been taken in most countries. In the majority of countries, it occurs only sporadically. Indeed, beri-beri has never been widespread among rural populations; it is connected rather with towns, armies, shipping, prisons, schools and large undertakings—in short, places where catering is collective.

" According to the data we have collected, pellagra does not play an important part in any of the Asiatic countries. . . .

" For the sunny countries of Asia, rickets does not constitute a problem of any importance, at all events where there are no particular habits of life or circumstances which preclude exposure to the sun.

" Wherever a detailed study of the teeth has been made in the countries of Eastern Asia, particularly among children and young persons, the findings have been unsatisfactory. Caries is commoner than was once thought. . . .

" The real cause lies in the diet. . . .

" In recent years, it has become more and more evident that various forms of anæmia may be due to an unbalanced or insufficient diet. . . . These forms of anæmia are found particularly among women, and more especially pregnant women. . . . If the question of the influence of diet on the composition of the blood has already proved of great importance for European and American countries, how much greater must its importance be in Asia, where diseases such as malaria, ankylostomiasis, kala-azar and others constitute a far-reaching menace to that most important element of life, the blood? These diseases have a powerful ally in under-nourishment, which undermines the power of resistance of whole groups of the population.

" Infant mortality is exceptionally high in all Asiatic countries. In several of them, it accounts for more than half the total mortality. It is true that the statistics are still far from reliable, except for Japan, but that the position is unfortunately as stated is beyond question. If the cause is sought, the direct or indirect significance of the factor of nutrition immediately comes into prominence. . . .

" Accordingly, the question of milk and foodstuffs to replace milk is of the greatest importance in Asia. The study of soya milk is being conducted on these lines; at the same time, attention has been unduly fixed on this, and the search

for other resources which might be discovered through collaboration with agricultural and veterinary services has been correspondingly neglected. Closer attention should be given to improved milk powders and varieties of sour milk. This would be a highly desirable task, particularly for health centres. A great deal can be done with relatively simple and inexpensive means. In another respect, infants have certain advantages in Asia: in sunny countries, they can be exposed daily to ultra-violet rays, so that there is very little likelihood of their being infected with bovine tuberculosis; and countries with abundant fruit and vegetables throughout the year provide an inexpensive supplementary diet of bananas, citrus fruit juice, etc. . . .

“ In several countries, however, diseases of the respiratory organs in children and young persons are common, and it seems hardly likely that diet is not to some extent accountable. There is clear evidence to show that, when food is scarce or unobtainable, the number of fatal cases of lung disease greatly increases. More exact data are urgently required on this point. . . .

“ Recently, evidence has been obtained which seems to show that the (vitamin) B complex also has considerable influence, especially on certain skin diseases. This is important, because it is precisely in the East that the B complex requires constant control in the diet.

“ In Asia, sick children are in great danger of incurring vitamin-A deficiency. In Europe, a sick child, particularly if suffering from intestinal troubles, is placed on a diet consisting largely of milk. In Asia, the place of milk is often taken by gruel; vegetables are withheld, so that the child's food is almost devoid of vitamin A. . . .

“ Lastly, investigations have been made into the part played by diet in various other diseases, such as tuberculosis, leprosy and the innumerable leg ulcers that are found in Oriental countries.

“ As regards the first, a great deal of work has been done in Europe, and it has been proved that under-nourishment plays a prominent part in the development of tuberculosis. As regards the connection between nutrition and leprosy, various investigations have been made in recent years, and some definite results seem to have been arrived at; but these investigations are still only in their initial stage.

“ As for the large leg ulcers, the general view at present is that diet plays a predominant part. Their occurrence is said to be attributable not so much to the absence of a particular vitamin as to general under-nourishment. . . .

“ In agricultural areas in Europe, it is found that 50 or 60% of the earnings of the working-class is spent on food. In Asia, the percentage is much higher. The subject has been very little studied, but the available data show that there are large areas where this proportion is 90% or even higher. Now, the possibility of improving the diet in quantity and in quality depends upon the state of the family finances. If 80 or 90% of the budget has to be spent on the most essential food—and such is undoubtedly the case in many parts of Asia—all efforts must be directed to reducing prices and to teaching the people wisdom in the choice and preparation of their food.

“ In such cases, any recommendation to improve the diet—for example, by increasing the consumption of milk and eggs—is quite useless; the proper course

is to find which of the foodstuffs approximate nearest to the food value of these articles. Progress along these lines has already been made in some countries by introducing the use of the soya bean and its derivatives, and in other countries by stimulating the consumption of fish and fish pastes. . . .

“ A well-fed and healthy population is vital to every country for its development and future. But, in all Asiatic countries, only relatively trifling sums are allocated to the detailed study of national nutrition or to attempts to improve it. . . .

“ The growth of the population and the ensuing increased importance of adequate nutrition will certainly help to wean most Governments from this shortsighted policy. The assertion often made by the authorities that very primitive peoples show an unerring intuition in regard to their food supply in time of need is obviously exaggerated, and, indeed, is contradicted by practical experience. A small measure of intuition there certainly is, but it can easily be overrated. . . .

“ The aim must be so to organise the work as to obtain the most efficient collaboration of all who are able and willing to take part in it. We have in mind co-operation of chemists, both analytical and synthetic, physiologists, physiological chemists, specialists in internal medicine, pediatricians, gynæcologists—in short, representatives of almost all branches of medicine and hygiene; and, in addition, agriculturists expert in the growing of fruit and vegetables, veterinary surgeons and, lastly, statisticians and economists. . . .

“ It is certain that, in Asia, international collaboration in this field is urgently needed.”

Colonial Areas.

24. The information at present available regarding the diet of native populations of colonial areas is not sufficient to form the basis of a comprehensive picture. In April 1936, the British Colonial Secretary addressed a circular letter on the subject of nutrition to the Governments of His Majesty's colonial possessions, directing their attention to the importance of the problem and requesting that a comprehensive survey of the position be made in each dependency. When these surveys have been made, much more information will no doubt be available regarding nutrition in colonial areas. For the present, however, it is necessary to rely on the observations of independent investigators.¹

25. Conditions, of course, differ widely in different colonial areas, but a recent careful analysis of the available material led to the conclusion that colonial populations in general are under-

¹ Certain observations have been collected by BURNET and AYKROYD in “ Nutrition and Public Health ” (*Quarterly Bulletin of the Health Organisation of the League of Nations*, June 1935); the present section is based on that document.

nourished.¹ In certain parts of Africa, the native is now always assured of a regular and constant food supply; after a good crop, he may enjoy a liberal diet for a time and, after a poor crop, he may fast. It is stated that the diets of native populations in African, Asiatic and Oceanic colonies tend, in spite of local differences, to show the same defects: "they are often insufficient in quantity and unsatisfactory as regards quality, in that they contain inadequate amounts of animal protein, mineral salts and vitamins. As a result, resistance to infection is low and infant mortality high. It is scarcely fanciful to ascribe the low birth rate observable in certain parts of Africa and Asia to dietary deficiency".

26. The protein intake of native populations in the tropics and the East is usually low. "All protein and fatty foods" in the mandated territory of New Guinea "are considered luxuries,"² and "the staple diet is mainly carbohydrate". Formerly, according to information supplied to the Mixed Committee by the Australian Government in 1936, "cannibalism was a definite adjunct to the protein diet, and this is not to be wondered at, considering the extreme scarcity of almost all forms of game in the territory" (of New Guinea). In the territory of Papua, the protein supply of the rural villages is occasionally supplemented with kangaroo-meat or pig, "but the amount cannot be very great".

Pastoral tribes are better off in this respect than those engaged in tillage. Thus, the Masai in British East Africa, who live mainly on meat, milk and blood, have a protein intake of 100-200 grammes daily. The bulk of the diet of most native African populations is, however, composed of cereals. Thus, in Morocco, it has been observed that increased prosperity results in the substitution of wheat for barley, meat consumption remaining low. In South Africa, maize forms a large part of the native diet and there is an "insufficiency of meat, milk, grain and vegetables". There is a prejudice in favour of white maize, which is deficient in vitamin A; "mealie food" also lacks vitamin C and, "as a result, native labourers often arrive in mines in a state of latent scurvy, which is cured (in spite of heavy work output) by the liberal diet supplied in the mines". The diet of the African native is generally deficient

¹ *Op. cit.*, page 126.

² League of Nations: "The Problem of Nutrition", Vol. III, page 20.

in animal fat; the fats most commonly consumed in many districts are palm oil and peanut oil.

27. In considering the incidence of deficiency diseases in native populations, account must be taken, not only of diet, but also of the profound changes in the character of the life and work of many native peoples during the past fifty years. Work on roads and railways and portorage work have "disturbed the easy traditional routines of the native and often subjected him to unaccustomed physical strain". According to one authority, the effects of malnutrition became noticeable in the natives of Morocco only when they were engaged in regular work on European lines.

28. "Disease and ill-health due to vitamin deficiency are common throughout the tropics and the Far East. Xerophthalmia exists in Uganda and Kenya. Night-blindness and keratomalacia, due to vitamin-A deficiency, have been observed in many parts of Asia and Africa. Other manifestations of vitamin-A deficiency, affecting the mouth and the skin, have been noted in Ceylon and West Africa and probably exist in many other regions. Adult and infantile beri-beri, closely related to vitamin-B₁ deficiency, are found wherever milled rice is used as staple cereal; many observers have commented on the waste and danger involved in the decortication of rice consumed by native populations. Scurvy has been observed among native adults in South and East Africa. Deficiency of vitamin E may play a part in reducing fertility in many tropical and Eastern countries. Apart from the recognised food-deficiency diseases, there can be little doubt that a vast amount of ill-health in the tropics and the East is due to the consumption of a diet deficient in vitamins and other food factors." ¹

¹ BURNET and AYKROYD: *op. cit.*, page 129.

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