

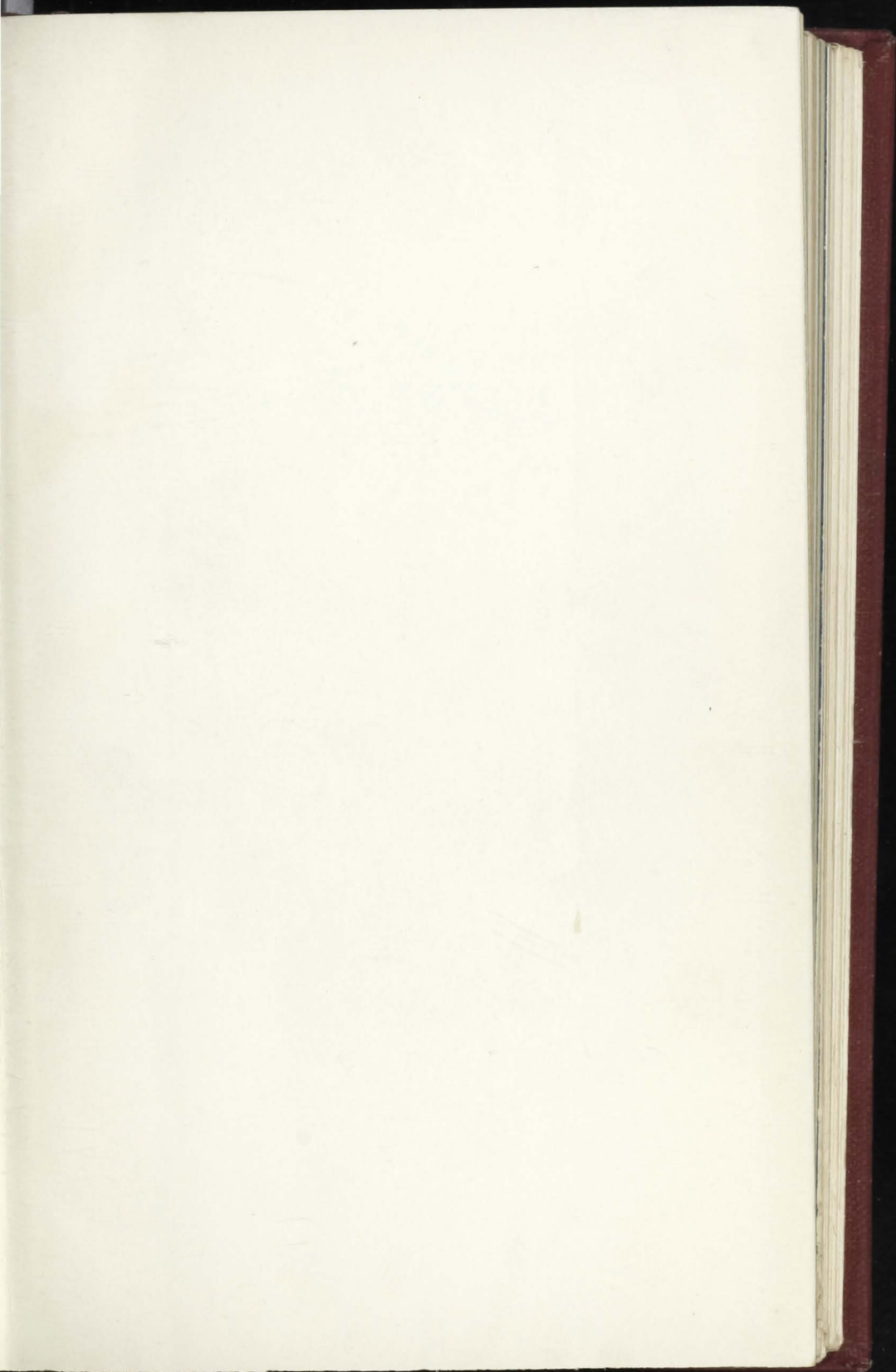
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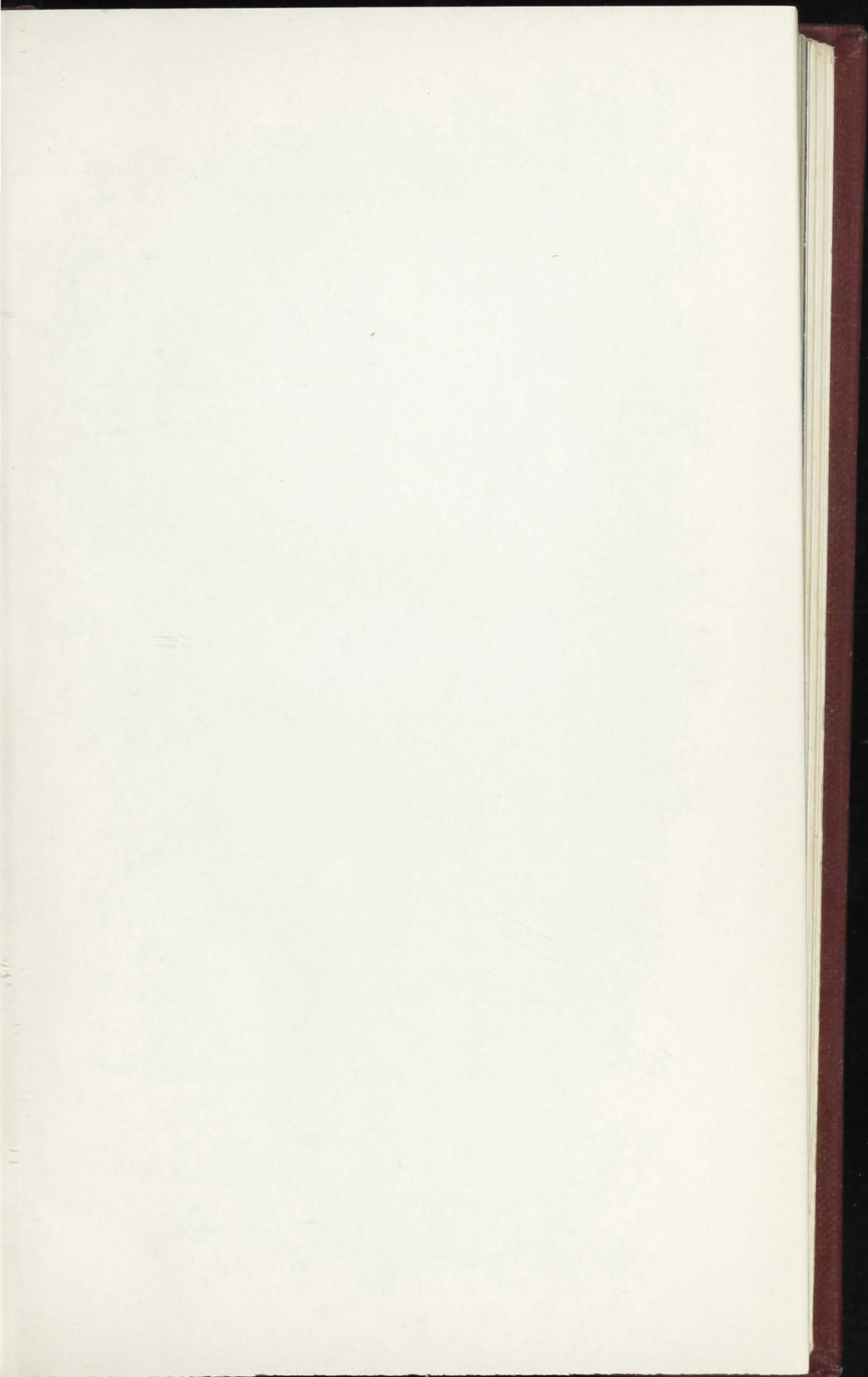


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**FABIAN
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**NUTRITION
IN
WAR**

by
SIR JOHN BOYD ORR
DSO, FRS

TRACT SERIES No 251

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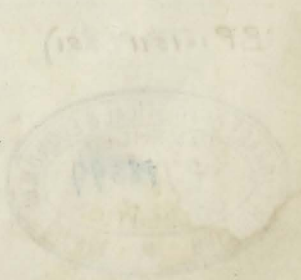
*Based on an address delivered to
a Fabian Society Conference
on Food Policy, February, 1940*

By
SIR JOHN BOYD ORR
DSO, FRS

*For the right moment you must wait . . .
but when the time comes you must strike
hard, as Fabius did.*

Fabian Tract No. 1

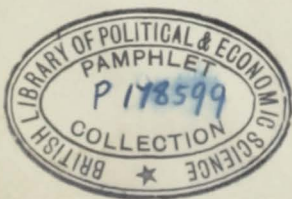
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April 1940

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NUTRITION IN WAR

Sir John Boyd Orr

DSO, FRS

Food was a decisive factor in the last war. Shortage of food and deterioration of quality did more to break the spirit of the German people than the defeat of their Army in the field. The Germans, knowing from their own experience how vulnerable the stomach is in war, intensified their U-boat campaign to cut off our food supplies and nearly succeeded. In 1917 shortage of food caused more anxiety than shortage of shells. Thanks mainly to the British Navy and the convoy system which defeated the U-boat, we managed to maintain and even increase our supplies. But we got through the war without any margin of safety.

Food may be even more important in the present war in which on both sides the Home Front is more vulnerable than the Fighting Front. The issue will depend very largely upon the morale and staying powers of the civilian population. We may be in for a long war which will strain our powers of endurance to the utmost. Already we have the blackout, the breaking-up of families, the anxieties, worries and feeling of depression which inevitably accompany war conditions. Ability to withstand the strain with cheerfulness depends very largely upon health. Our food policy should, therefore, be based on the health requirements of the people.

1 NEWER NUTRITION KNOWLEDGE

Our ideas of food requirements for health are very different from what they were at the beginning of the last war. In 1914 it was assumed that if people had sufficient food to prevent them from being hungry, the food problem was solved. The remarkable discoveries of the last twenty-five years on the influence of food on health have taught us that the diet, in addition to satisfying hunger, must provide a sufficiency of specific nutrients required for health. These discoveries have such an important bearing upon the war food problem that I would like to devote some space to a review of what is known as the 'newer knowledge of nutrition'.

Deficiency Diseases

It is now common knowledge that lack of certain vitamins or minerals may be followed by deficiency diseases, such as rickets, beriberi, scurvy and anæmia. The discovery that there were a number of commonly occurring diseases which were due solely to the lack of certain substances in the diet marked an important advance in medicine because these diseases were so prevalent. At the beginning of the present century, in some industrial towns, more than half of the children in the poorer districts suffered from rickets to such an extent that those who recovered were left with permanent deformities of the skeleton.

The discovery of the cause of these deficiency diseases was only the first fruits of the new knowledge. It soon became obvious that there were all stages of deficiency disease from perfect health to cases so severe that the sufferers died. A large proportion of the indefinite ill-health from which people suffer is now known to be due to borderline dietary deficiency.

People suffering from any degree of malnutrition due to defective diet are more susceptible to certain infectious diseases. This is especially true of tuberculosis. Tuberculosis and malnutrition go together. In other cases, malnutrition, so far as is known, may not affect susceptibility to the primary condition, but it may affect resistance to intercurrent infections. This is probably especially true of measles. The respiratory system is liable to other infections in measles. These often lead to purulent conditions of the middle ear with resulting deafness. There is a good deal of evidence to show that the sequelæ of measles are more severe in ill-nourished than in well-nourished children. In war, food shortage is always accompanied by a great increase of infectious disease. In Germany, there was a big rise in the tuberculosis death rate in the latter stages of the last war and the return of 'galloping consumption', the acute form of tuberculosis which had almost disappeared.

There is another aspect of nutrition which is just beginning to be investigated. Deficiencies in the diet may have mental as well as physical effects. The person suffering from deficiency of vitamin B1 is apt to be listless and apathetic. In the East, where many people suffer from this disease, there is a saying which illustrates the progressive stages: 'It is better to walk than to run; it is better to stand than to walk; it is better to lie than to stand; it is better to sleep than to wake; it is better to die than to live.' People suffering from calcium starvation, as occurs in children with rickets, are apt to be irritable. Hyperexcitability alternates with apathy and reluctance to take any bodily exercise. Women suffering from nutritional anæmia show lack of spirit which is reflected in their appearance, dress and housekeeping.

We are sometimes too apt to blame the housewives in the poorer districts for ignorance and carelessness shown in their bad cooking and bad household management. My own investigations, made in connection with dietary surveys, make me believe that bad cooking and general thriftlessness is not nearly so common amongst the poor as some would have us think. But where it does occur, sympathy is more appropriate than blame. We should remember that we are dealing with women who, in most cases, are physically, mentally and spiritually sick. In many cases, a few weeks on a diet with an abundance of milk, eggs, fruit and vegetables, such as we enjoy, would make a marked difference in the health and outlook of these women.

Public Health

This new knowledge of the effect of food on health is now being applied to the cure and prevention of diseases caused directly or indirectly by faulty diet. Our public health measures are now largely designed to make good the deficiencies in the diet of the poorest of the community. Owing to the rise in the standard of living, which has enabled a larger proportion of the population to purchase sufficient of the 'protective' foods, and to public health measures, such as the issue of free or cheap milk and cod liver oil at Maternity Centres and Child Welfare Clinics and the provision of free or cheap meals and milk in schools, there has been a very great improvement in the national dietary in the last twenty-five years. With this improvement, gross forms of deficiency diseases, such as rickets in children and scurvy in infants, have been almost completely eliminated. The infant mortality rate from tuberculosis, which was due largely to faulty diet, has been reduced by about 50%; and the children of today are taller and of better physique than their parents were at the same age. It is encouraging to note that the rate of improvement has been even greater in the last five years.

One in Three Below the Minimum

Although there has been such an improvement, especially in the last five or six years, there is still a large part of the population whose diet is not up to the standard which we now know to be necessary for health. When we use either the B M A diet at 'minimum cost' or the League of Nations 'optimum diet' as a yardstick, and apply it to the kind of diets in common use, we find that the diet of about one-third of the population is still not good enough to maintain the highest state of health and physical fitness. Dietary surveys show that the quality of the diet of this third of the population becomes worse as family income falls. The main cause of the faulty diet is lack of purchasing power. Unfortunately, the protective foods, such as milk, dairy products, vegetables, fruit and eggs, which are rich in the vitamins and minerals needed for health, are relatively expensive. Consequently, the poorer the family, the lower is the consumption of these and the more is the diet restricted to the cheap energy-yielding foods, which satisfy hunger at low cost.

In many families, the quality of the diet could be improved by more skilful expenditure of the money spent on food. There are differences in the health value of the diet of families with the same income. But there is a level below which it is impossible to obtain a diet fully adequate for health. The Government Advisory Committee on Nutrition recommends that with the kind of diet in use among working-class families, every child should have at least $1\frac{1}{2}$ pints of milk per day to supply proteins, vitamins and minerals needed for health. At present prices, the milk needed

by a child, apart altogether from the other foods and other necessities of life, would cost more than 3/- per week. If 3/- be the amount available to keep a child, you cannot expect to be able to rear it in health and physical fitness. It is impossible to give a figure for the cost of an adequate diet because prices vary in different districts and in different seasons. Before the war, the cost for families in towns without gardens or allotments could not be less than from 7/- to 8/- per head per week. There are many families with children whose income is insufficient to enable that amount per head to be spent on food. Mr. Seebohm Rowntree did an investigation on the cost of living. He made out a cheap diet. To keep the cost as low as possible he left out all expensive foodstuffs. The diet contained no liquid milk and no butter. It was a diet on which neither you nor I would care to live. It was one on which it would be impossible to rear children in perfect health and yet he came to the conclusion that there were millions of our fellow-countrymen who are so poor that they cannot afford even such a poor diet. The most unfortunate feature of the situation is that the families who cannot afford that diet are those with children. I wish our politicians would read reports such as those of Mr. Rowntree and the late Dr. McGonigle, who was Medical Officer of Health for Stockton-on-Tees, and while reading them remember the profound saying of the late King George that 'the glory of a country is in the homes of its people'.

Of course, we recognise in a half-hearted way that the poor people are badly fed and our social and public health services provide small amounts of milk, cod liver oil and other health foods to mothers and children and necessitous families and to school children. These measures do a great deal of good in preventing the worst forms of malnutrition. It is largely due to these measures that there has been such a marked improvement in health and physique in recent years. But, valuable though they are, they do not completely solve the problem of malnutrition. That problem will never be solved until our national food policy is based on the food requirements of the people and not on the interests of trade as it has been in the past.

I have been dealing with the position as it is in our own country. We are not worse off than the other great nations. The United States of America is probably now the wealthiest country in the world and the food position of the poor there is not any better than it is with us. The best fed people in the world are those of the small democratic States where, on the whole, there are not the extremes of wealth and poverty which we find in the bigger nations.

Food and Physique

If food is so important for health and physical fitness as I have suggested, then we should find that there is a correlation

between the kind of food eaten and health and physique. We have too little evidence on this, but such investigations as have been done suggest that there is a correlation. Thus, for example, Sir Robert McCarrison in India noted that there was a marked difference in health, physique and the incidence of disease between the hill tribes, like the Sikhs, and the plain tribes, like the Madrasi and Bengali. He examined the diets and found that the former lived on natural foods, which supplied all the proteins, vitamins and minerals in sufficient amounts, whereas the latter lived largely on rice and other carbohydrate foods, which are deficient in nutrients essential for health. To investigate the question further, he fed thousands of rats on the food eaten by the hill tribes and thousands more of comparable rats on the food eaten by the tribes on the plains. The difference in physique and in the incidence of disease found between the hill tribes and plain tribes was repeated in the rats.

At the same time as that investigation was being done in India, another one was done in Africa. The late Lord Balfour, hearing that there were two tribes living under the same environmental conditions but on very different diets, made arrangements for an investigation of the diets and health and physique of the two tribes. The difference in the stature and the incidence of disease found was what might have been predicted from an examination of the kind of diets in use in the two tribes.

In our own country, we find, as I have said, that as family income falls, the quality of the diet deteriorates. Nutritional diseases, such as anæmia and rickets, are commoner among the poor than among the well-to-do. The infant mortality rate is two to three times as high; tuberculosis is twice as prevalent; the average stature among the well-to-do is three to four inches greater than among the poor. Of course, we must keep in view that poverty is associated with other conditions which affect health, such as bad housing and psychological factors. There are also heredity factors. In the past, however, we have been too prone to attribute the difference between the poor and the well-to-do merely to heredity. I find it difficult to believe that the acquisitive characteristics necessary for the accumulation of wealth can be correlated with either fine physique or even fine intelligence. We shall never be able to estimate the relative importance of heredity and environment until the environment of the poor, with respect to food, housing and other factors affecting health, is as good as the environment of the well-to-do. In our social measures, we should act on the assumption that the higher incidence of disease and poor physique found among the poor is due mainly to environmental factors, which we can deal with, instead of to hereditary factors, which are beyond our control.

As a matter of fact, we find that as the national diet has improved, health and physique have improved. When children of

the poor are fed on the same diet as the children of the well-to-do they tend to grow at approximately the same rate and are as free from nutritional diseases. It is probable that if their diet were as good, there would be little difference between the children in the poor areas and those in well-to-do areas.

When we consider the remarkable improvement in health which has accompanied improvement in feeding, we must all regret that in the past ten years, when there was so much actual or potential food available, we did not have a food policy based on health requirements with sufficient of the protective foods to meet the needs of the whole population and with the prices adjusted to the purchasing power of the poorest. If we had had that policy in the past, the war food problem would have been much simpler than it is.

2 THE SUPPLY OF ESSENTIAL FOODS

Let us now consider our war food policy. I presume that we are all agreed that the policy should be based on food requirements for the highest possible state of physical and mental efficiency. To attain this, we must increase the production or imports of protective foods to bring consumption among the poorest third of the population up to the level of the middle classes. Then we must also increase the total amount of food. The food requirements of men entering the Fighting Forces will be increased by nearly 30%. The same is true of unemployed men taken into industry. Unemployed men or those engaged in sedentary occupations can get along with about 2,500 calories per day or less, whereas men in the Fighting Forces need about 4,000 and men in heavy industries need between 3,000 and 4,000. Under the war conditions, when every fit person is either working or fighting, as should be the case if the war continues, the total food requirements of the nation will increase by probably as much as 10%. We are thus faced with the necessity of increasing the protective foods and also of increasing the total national supply at a time when we must economise both in shipping space and in foreign credits. It is reckoned that in peacetime we produce about 40% of our food. As a matter of fact, however, we produce less than that because some of our foods are produced from imported feeding-stuffs. The net home production is not more than one-third of total consumption. We devote about 20 million tons of shipping to the importation of food and feedingstuffs.

We cannot continue to use this great volume of shipping for food in wartime and if the war continues it is doubtful whether we shall have the amount of foreign credits to spend on food. It is necessary, therefore, to have a food policy which will reduce imports to the minimum. In peacetime, the national dietary consists of a very large number of foodstuffs. We draw food from every part of the world. In war, we must have an order of priority

for both home-produced and imported foods. We should decide, in the light of shipping difficulties and of our capacity to produce at home, the foods from which we can best meet national requirements and concentrate first on having an adequate supply of these.

Potatoes

Take, first, the protective foods. Fortunately, we can get all the vitamins and minerals we need from a few foods which we can produce at home in abundance. Potatoes, vegetables and milk, taken together in sufficient amounts, will supply all the health factors. Indeed, it is possible to have a fully adequate diet on these alone. These are the foods which our country is best adapted to produce. We are trying to plough up an additional 2 million acres of pasture. The potato is probably the best first crop to take out of old pasture. Further, an acre of potatoes yields more than twice as much food as an acre of grain in addition to being of greater health value. The potato is the best insurance crop in war. With the danger of a food shortage, potato production should be greatly increased. In this country, the consumption of potatoes is only about half what it is in Germany and Belgium. Apart altogether from the necessities of war, we could, with advantage to national health, double our consumption of potatoes. The yield of potatoes per acre fluctuates from year to year. We have had three good potato years. It is very seldom you get four good years in succession. There is a possibility of the present year turning out to be a bad year for potatoes with a low yield per acre. If we have a bad year and our potato acreage is not increased, we might have a smaller supply of potatoes than we have had for the last two or three years. In a war which is full of uncertainties, this is a dangerous position. Of course, on the other hand, we might have a bumper potato crop with a surplus. If, however, the retail price of potatoes is brought low enough, the surplus would be consumed. Even if it were not consumed, the potato is a good feedingstuff both for cattle and pigs, and we shall be short of feedingstuffs throughout the war.

Vegetables

Some of the common vegetables, such as kale, turnips and carrots, give as much or more food per acre than wheat and, per unit food value, they take up much more shipping space than wheat. If we are going to bring the national dietary up to the standard for health, we must have a greatly increased supply of vegetables even though we continue to import the same amount of fruit and vegetables. If the shipping position becomes so difficult that it is impossible to import fruit and vegetables, then the necessity for increasing vegetable production will become all the greater.

In towns, vegetables are expensive. The cost consists mainly of the cost of distribution. There have been occasions in the last few years when vegetables have been allowed to go to waste in the country because the price offered the farmer was not sufficient to cover the cost of harvesting, despatch and selling commissions. There have been several schemes suggested for improving the distribution of vegetables to reduce both the wastage and the cost. These schemes should be re-examined in the light of war needs. It might be possible to establish a number of local markets to prevent the necessity for vegetables all passing through large markets, like Covent Garden, or arrangements might be made for vegetables to go direct from the farmer to the retailer. The Government has decided to subsidise foods. A part of the money might well be devoted to bearing the cost of reorganising the distribution of vegetables to reduce the present wide gap between what the grower receives and what the consumer in the cities has to pay.

A great part of the difficulty in the transport of vegetables can be overcome by having as many families as possible growing their own vegetables. The allotment scheme should be pushed with the utmost vigour and as many families as possible should be induced to grow vegetables. It is estimated that there are about $3\frac{1}{2}$ million gardens in the country. It should be possible to use 1,500 as allotments. If we devoted land to that purpose, even vacant spaces in cities, the numbers of allotments could be still further increased. There are between 10 and 12 million households in the country. It should be possible to have about half of the households partly self-supporting in vegetables. This would go far to solve the difficulties of transport and the high cost of distribution.

Milk and Eggs

During the war, there will be a shortage of feedingstuffs. In peacetime, we import about $8\frac{1}{2}$ million tons. British farming in recent years has tended to become more and more a process of transforming imported feedingstuffs into animal products, such as eggs, bacon, beef and milk. It takes from 5 to as much as 20 lb of feedingstuffs to produce 1 lb of animal product for human consumption. It is obviously uneconomical in a time of shipping scarcity to import feedingstuffs.

Of all the farm animals, the cow is the most efficient transformer. It produces four times as much food in the form of milk for the feedingstuff consumed as does the bullock in the form of beef, and, as milk is a much more important food than beef, the cow should have priority in whatever feedingstuffs are available. Milk is so important that production should be increased. We could increase production even though the importation of feedingstuffs were reduced to oil seeds which we must import for the oil.

The residues, after the expression of the oil, together with cereals not needed for human consumption, would be sufficient to maintain winter production, provided our fodder crops were increased.

Next to the cow, the pig and the hen are the most efficient transformers. For a given quantity, the pig yields more, reckoned as calories, than does the hen. On the other hand, eggs are more valuable for health than bacon and there are more smallholders dependent upon poultry than upon pigs. On the whole, therefore, whatever feedingstuffs are available will probably be better devoted to the poultry industry.

Although we used little or no feedingstuffs for beef, that would not mean that home production of beef and mutton would disappear. These are produced mainly off grass and fodder crops. The imported concentrates are used mainly for putting the finish on to fat cattle to produce high quality beef. In wartime, we should be satisfied if we get ordinary quality of beef. Even though we are able to maintain the import of feedingstuffs, we are not justified in risking the lives of our sailors merely to provide a luxury form of food for part of the population which can afford to buy it.

If we had sufficient home produced milk, vegetables and potatoes, we could, if necessary, reduce our imports to the easily imported energy-yielding foods, *viz.* wheat, fats and sugar. We could import a sufficient amount of these to meet the needs of the whole population with one-third of the shipping space devoted to food imports in peacetime.

An Adequate Diet

With a few essential foods, such as those named, *viz.* milk, vegetables, potatoes, bread, oatmeal, margarine or butter and sugar, the whole population could have a diet adequate for health—a diet much better than the poorest third of the population has at the present time. If our war food policy is to be based on national food requirements, then we should concentrate on a few essential foods, such as those named. The protective foods named are those for which our agriculture is best adapted and the energy-yielding foods are those which cost less and take up the smallest shipping space in proportion to food value. We should produce or import these in such abundance that there would be plenty for everybody without any rationing and we should adjust the price to bring a sufficient amount within the purchasing power of the poorest family.

Even though we adopted such a policy, it would never be necessary to have even the poorest family subsisting only on these foods. Even without any imports, other than wheat, fats and sugar, we would still have all the other foods, beef, mutton, fish, fruit, eggs and bacon and small amounts of other foods, which we produce at home and, fortunately, the almost universal beverage,

tea, does not take up much shipping space. Further, even though we adopted a policy for providing, first, the essential foods, there would also be a certain amount of other foods imported. For example, we are buying food from Eastern Europe to keep it out of the hands of the enemy. The probability is that we shall have such a store of dried fruits that there will be difficulty in getting them consumed unless the price is reduced. Cheese, which we import from Canada, may continue to be available in sufficient amounts to meet the needs of everybody.

3 A PRICE THE POOR CAN PAY

I have tried to show that if we had a food plan based on health requirements and if we increased home production to the utmost and produced the right kind of food at home in view of the necessity for economising in shipping space, the nation could have a better diet than it has at the present time with less than half of the shipping space devoted to food and feedingstuffs in peacetime.

The difficulty is not one of maintaining the national supplies. It is, as it was in peacetime, one of bringing the health foods within the purchasing power of the working-class family with children.

Rationing

The present system of rationing and price fixing will not do that. The protective foods are already more rigorously rationed by prices than by the present system of coupons. The coupons provided in March for 4 oz of bacon and 8 oz of butter. One-third of the population cannot buy these amounts. Some households are so poor that they never have butter at all. These households will not purchase the rationed amounts. The result will be that regulations will be evaded or food will accumulate unsold. It will be necessary either to increase the ration so that those who have the money will be able to get more or to decrease the price so that more families will be able to purchase the rationed amount. Those who worked out these schemes did not take sufficient account of the information we now have on food consumption and money available to purchase food at different income levels.

Price Fixing

Nor will price fixing help the poor to obtain the food they need. The prices will be fixed on information given by the trade, who will see that the margins are sufficient to maintain their profits. But the distributive margin varies in different shops. Some shops give an expensive service. Other shops supply their goods 'cash and carry' across the counter. The margin is likely to be fixed at the higher level and the poor will be forced to pay for an expensive service which they cannot afford and won't get. Another

difficulty about price fixing is that there are various qualities of most commodities. Thus, in peacetime, butter might vary from 1/- to 1/7 per lb according to the quality. When the price is fixed, quality goes by the board. But the price is likely to be fixed at the higher instead of at the lower level, in which case, poor families will need to do with less.

A Criticism

If food is to be rationed and prices fixed, then the prices should be fixed so that the rationed amount is within the purchasing power of every family. If that is not done, the issue of coupons does not make for an equal distribution of the food available.

The working out of our food policy, so far, has been too much in the hands of officials and trade representatives. Sir William Beveridge recently in a letter to *The Times* called attention to the danger of leaving the control in the hands of people who were interested in the commodities controlled, and Mr Charles Smith, in a recent publication issued by the Society, has enlarged upon the same subject. There is therefore no need for me to deal with it except to say that there is a danger of the big trading interests getting a more complete grip of the food of the country. The danger is increased by the fact that there are now many thousands of new officials whose job depends upon keeping the system going.

The value of the system can be judged by the extent to which it (a) increases the total amount of food available and (b) brings a sufficient amount of the essential foods within the purchasing power of poor families. It is doubtful to what extent the present complicated system of rationing with all the inconvenience it causes to the public and shopkeepers contributes sufficient to these objectives to make it worth while. Thanks to the British Navy there has so far been no shortage of food and if we have a food policy based on human requirements, increasing production of the right kind of foods to the utmost and importing foods which, together with what is produced at home, provide a national dietary adequate for health, we might be able to carry through the war without the inconvenience of rationing.

A Long Term Policy

If we are going to have a food plan based on human requirements, the first thing to do is to get information on what national requirements are and what foods can best meet these requirements. The Medical Research Council has a Nutrition Committee which has been studying this subject for years. It could supply the information. With regard to the more difficult question of adjusting prices to purchasing power, the Government Advisory Committee on Nutrition has the information on family incomes and the

proportion of these incomes available for food. With regard to the possibilities of home production, the Agricultural Research Council, which controls about a dozen Research Institutes covering all different branches of farming, including economics and costings, could supply invaluable information on the capacity of our land to produce food and the foods most suited for increased production, and on the best methods of getting the additional foods we need. These are organisations which were set up by the Government since the last war. They are national bodies completely independent of the trades and with no interest other than the service of the whole community. It is rather a pity that more use was not made of these bodies.

We are only at the beginning of what looks like being a long grim struggle, in which food may be, as it was in the last war, the decisive factor for victory. Even when the war is finished, there may be a long difficult period of dislocation of trade, increased unemployment, food scarcity and poverty. It is not sufficient merely to have an elaborate system of rationing which, as we have seen, does not make the food available to the whole population. We need a long-term food policy which will carry us through the war with our limited resources of shipping and foreign credits and which will also carry us through the almost equally difficult period of post-war reconstruction. It would be worth while appointing a Food Council of completely independent people, with no interest in the food trades, to review the situation and try to evolve a policy which, however poor the nation or any part of the nation may be, would provide sufficient of the essential foods to meet the health needs of every family.

Feeding the People in War-time

by Sir JOHN BOYD ORR, D.S.O., F.R.S., and

DAVID MILES LUBBOCK

“There is much to be said for the case which Sir John Orr has presented for reviewing the nation's food policy and making clearer the part which home production should be required to take. He examines the problem of food supplies from a health point of view.” *The Times*

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