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TENTH BOYD ORR MEMORIAL LECTURE

Food policy, nutrition and government

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Any historical account of the policies of governments about food must start with famine. In the Revelation of St John the Divine, Famine is portrayed riding a black horse preceded by War and Desolation and followed by Pestilence. Accounts of famine abound from the very earliest recorded writings to the present day. Usually famine has been due to failure of crops, with drought, as in the current disaster in Ethiopia, the foremost cause. However, flooding, war and destruction of crops by pests have also been important causes of famine.

As far as the response of government to famine is concerned, we know that Constantine the Great sent food to Antioch in AD 331 as did Theodoric the Great to Venice in AD 520. But it is probable that it was the special problem of the unpredictability of the great annual inundation of the River Nile in a country with no rain that first forced a government to develop a policy to prevent famine. According to Genesis, Chapter 41: '(Joseph) gathered up all the food of the seven years of plenty which were in the land of Egypt . . . and gathered corn as the sand of the sea. (Then) the seven years of famine began to come as Joseph had said. There was famine in every country but there was bread to be had throughout the land of Egypt. Then Joseph opened all the granaries and sold corn unto the Egyptians.' An Egyptian inscription of great antiquity gives an authentic description of famine and of the clinical manifestations of starvation associated with repeated failure of the Nile flood.

Over the centuries the British Isles have not been untouched by famine and I will return to two 19th-century examples of government famine policy in due course. But the first unequivocal and decisive action by the British government in a nutritional matter came not in respect of famine but in relation to the prevention of scurvy at sea in the Royal Navy. The story of scurvy is a story of lessons learned and then forgotten, only to be relearned and then forgotten again. As early as 1600, Sir James Lankester, who commanded the East India Company's first fleet sailing

to the East Indies, provided lemon juice daily for his sailors and thereby avoided scurvy, and his surgeon John Woodall gives a clear account of the value of lemons in his book *The Surgeon's Mate* published in 1617. However, it was not for almost 200 years, until 1796, after many disastrous voyages and the prescription of many useless remedies, that the issue of daily citrus juice became compulsory in the Royal Navy. This action virtually extinguished sea scurvy in the Navy and by reducing the sick list from 23% in 1782 to 7% in the year of Trafalgar, undoubtedly paved the way for Nelson's victories. But although scurvy was also known to be prevalent on land it was not seen as necessary to provide an appropriate preventive remedy either to the Army in the Crimean War or much later to Scott's Polar Expedition with, in each case, disastrous results. The thin red line at Balaclava was, thanks to scurvy, much thinner than it need have been.

I cannot speak of scurvy in Scotland without mentioning the work of Dr James Lind. As Lind himself averred in his book published in Edinburgh in 1753, the juice of oranges and lemons had been used in the prevention and treatment of scurvy amongst many other treatments for at least 200 years. Lind's contribution, based on his celebrated experiment on twelve sailors suffering from scurvy in HMS *Salisbury*, was that by producing actual scientific evidence of benefit in a controlled manner he hastened general acceptance of the treatment and the implementation of the effective policy at sea to which I have referred.

Now I turn to the year 1845 and to what in those days could properly in terms of political responsibility be described as John Bull's Other Island, Ireland. In order that the Irish potato famine be understood it is necessary first to set the scene. There are three essential facts. The first of these is that the population of Ireland doubled in the early decades of the 19th century and by 1841 had reached the unparalleled figure of 8 000 000; the second is that the diet of at least one-third of the people consisted almost exclusively of potatoes, several pounds daily with a little milk and occasional fish or meat; and third that almost all of them depended for their nourishment on what they grew on a tiny plot of land. As they sold their labour and often such cereals as they grew to pay the landlord's rent they had little cash in hand to buy food. Further it must be said that due to the population explosion, and the resulting enormous pressure on the land, the position before the failure of the potato crop in 1845 was already precarious. Finally, due to the arrival of a fungus at the time unrecognized and previously unknown outside America, *Phytophthora infestans*, otherwise known as potato blight, almost none of the staple crop grown in Ireland in 1845 could be eaten; the same disaster struck in 1846 and again in 1848. The crop of 1847 was sound but because by this time the population was much weakened and their supply of seed potatoes was meagre, it was too small to be much help. To crown everything the winter of 1846-47 was the worst in living memory.

The first response of the British government was both relevant and timely. By November 1845, the Prime Minister, Sir Robert Peel, had ordered a large quantity of maize from the United States, set up a relief commission in Dublin and by repealing the corn laws removed all import duties on grain from abroad. Whether

under Peel's influence these measures would have mitigated the situation will never be known as the government fell and Peel left office in June 1846.

As the responsibility for the disaster which followed must rest chiefly on the shoulders of Charles Trevelyan, Permanent Head of the Treasury of the day, I must digress to describe what made this man tick. While Charles Trevelyan was undoubtedly brilliant, hard working to a fault, religious, and of the highest probity, the factor which determined the outcome as far as Ireland was concerned was his conviction that the economic theory of the day, the so-called 'political economy' of Adam Smith, should determine the government's response to the crisis. This theory held that the provision of famine relief, as we would understand it, or in other words free food for the starving, would be a remedy in the short term only and would lead on to the worse disaster of widespread demoralization and mendicancy, destroying also the market on which the future hope of the prosperity of Ireland depended. The maize imported from America must not be given away to the starving, but sold at a price. The money to buy it would be provided by wages paid to people employed on a programme of public works; wages fixed at a lower than normal rate so as not to interfere with market forces. So as not to undermine market forces the corn depots must not be opened until all local food had been exhausted; the programme of public works to employ the people must not be useful to any farmer or landowner and exports of meat and grain from Ireland must continue in spite of the famine. It was not a question of bread today, jam tomorrow, but a question of no bread today on the supposition that this might help the provision of bread tomorrow. The result was a catastrophe unparalleled in the history of the British Isles since the Black Death. About 1 000 000 Irish people died of starvation, typhus and relapsing fever during the period 1845-49 and a further 1 500 000 emigrated.

The most astonishing feature of this episode is the force with which Trevelyan applied his economic theory and how, in spite of the reports of calamity which flooded in, he stuck with it to the bitter end. Charles Trevelyan was knighted in 1874 for his work in Ireland. Happily there was more constructive work ahead for him including the report with Northcote entitled *The Organisation of the Permanent Civil Service* which set the scene for the Civil Service for a century; reform of the British Army; and during a period as President of Madras, a gentler hand, perhaps due to his Irish experience, in various famines in India.

In view of what happened in Ireland, it is fortunate that the British government can properly claim the first successful intervention based on medical science in a famine. I refer to the cotton famine in Lancashire in the Period 1861-65. Due to the blockade of the ports of the American Confederacy during the Civil War, no cotton reached Lancashire. There was therefore no work, no wages, and in days when there was no relief, widespread starvation ensued. My predecessor, Sir John Simon, instituted an urgent survey. He found that the minimum amount of money (for the cotton famine was due to lack of money not food) needed 'to prevent starvation diseases' was two shillings per head weekly. His report also discussed what foods should be given priority to be bought with this and what should be

bought if a little more money (25 or 50%) could be made available. The importance of this survey, which was conducted by Dr Edward Smith on behalf of Simon, was not only that it established a 'minimum subsistence level' below which life could not for long be supported, but for the first time it considered the nutritional value of food as well as its cost. It also noted, and this foreshadowed many events to come, that among working people mothers fed themselves and their children much less well than they fed their bread-winning husbands.

It is said in retrospect that Britain reached the peak of her economic and political power in the 1870s. At this time in addition to commanding the majority of the world's primary resources, British exports were of greater value than those of the United States, Germany and France combined, and her ships carried much of the world's trade. That such success should foster complacency is understandable. In the public health field, all eyes were fixed in the last decades of the century on the dazzling success of the movement for sanitary reform, on the control of such diseases as cholera and on the germ theory of disease. As far as food policy was concerned, the government's attention during this period was focused on controlling the worst abuses of adulteration. Due largely to a remarkable campaign carried out by Thomas Wakley in the columns of the *Lancet*, effective legislation to ensure the quality of food eventually reached the Statute Book in 1875. Enforcement was assisted by the appointment of public analysts in every district.

It required the experience of the recruiting officers for the South African War to demonstrate that a policy to provide clean water, pure food and proper sewage had been insufficient to ensure the health or indeed the proper growth of the majority of British children. During 1902 reports appeared in the press which claimed that up to two-thirds of the recruits examined for service in 1899 had been rejected because of unsatisfactory physique. This led to widespread public concern. The reports were supported by the findings of a Royal Commission on Physical Training in Scotland which in 1903 showed much evidence of ill health and physical disability in Scottish schoolchildren. The work of the inter-departmental committee which Mr Balfour set up in September 1903 to look into the situation, turned out to be so important that it is difficult to summarize in a few words. While it was unable to find evidence of an actual deterioration of the national health, the committee, working at great speed, drew a shocking picture of deprivation, overcrowding and malnourishment. Its recommendations opened the way for most of the social legislation of the 20th century and set the climate which led to the creation in 1919 of central government Departments of State responsible for health both in England and Wales and in Scotland.

From the point of view of the subject of this lecture, the report led to the first Act on the Statute Book which had the specific object of improving nutrition. The Education (Provision of Meals) Act of 1906 gave local education authorities power to provide meals free or at reduced charge for necessitous children. In the following year a further Education Act set up the school health service which included, as an object, the surveillance of the nutritional status of children. So by the beginning of

the First World War, to the long-recognized duty of the State to relieve famine had been added responsibility for purity and safety of food, for surveillance of the nutritional status of children, and for discretion to supplement at public expense the diet of at least one vulnerable group. But what should those supplements contain? On this crucial point there was as yet little known.

The period between the two wars saw the flowering of nutritional science. In due course this extended both the responsibility of government in relation to food policy and its power to intervene effectively. The change happened in two main ways. The first, based on a number of ingenious experiments with laboratory animals, was the identification of the accessory food factors, in other words, the specific minerals and vitamins which, in addition to the main sources of energy, are essential to normal growth and health and lack of which causes such conditions as rickets, scurvy, pellagra and nutritional anaemia. It was found that milk and fresh vegetables and fruit were particularly rich in these substances and the importance of these so-called 'protective foods' in the diet was pointed out in a report from the Minister of Health to local authorities in 1921 and again, with more precise quantitative details, in the First Report of the Advisory Committee on Nutrition (of which John Boyd Orr was a signatory) in 1937.

Boyd Orr and Rowett were also crucially concerned with the second important development of this period, the application of epidemiological methods to the study of nutrition in human populations, thus putting such inspired initiatives as had been attempted 80 years previously by Edward Smith in Lancashire on a sounder statistical basis. In his celebrated survey published in 1936, Boyd Orr used what he described as 'the newer knowledge of nutrition' to demonstrate gross differences in general health, growth in children and stature between the various income groups due to inadequacies of diet. The survey found a difference in stature between boys aged 14 years at private schools and boys at council schools of no less than 7 in.: a comparison today would yield a difference of about 1 in.

Like Trevelyan almost a century before, Boyd Orr received a knighthood for his work. There is, however, a double irony in the comparison. Trevelyan was rewarded for what was thought to be an administrative triumph but was actually an unmitigated disaster. Boyd Orr's reward indicated shamefaced acceptance by the government of the day of the criticism implied by his survey. In the long term this led to the conferment of great benefits on the health of the poor. This was also the period when feeding studies in children such as those of Cory Mann showed that the addition of milk and other supplements not only improved physique and stature but reduced mortality, the occurrence of infections and even perhaps improved intellectual performance at school.

When the Second World War brought for the second time the threat of starvation due to prolonged siege by submarine warfare, it was fortunate that there was available to government a sound scientific basis for a national food policy. Although, as we saw with scurvy, the learning of a scientific lesson does not guarantee its application and there is often a long gap between a discovery and its translation into effective policy, in 1939, happily for Britain, the right people were

for once in the right place at the right time. Lord Woolton with the scientific advice of Sir Jack Drummond at the Ministry of Food and Sir Wilson Jamieson with the help of John Boyd Orr at the Ministry of Health, together formulated a national nutrition policy, the aim of which was to maintain and (note this) to improve the nutritional value of the diet.

The scope of the measures taken, as well as the effectiveness with which they were applied, was remarkable. The policies included increasing the supply of milk, particularly for expectant and nursing mothers, infants and children; the provision of vitamin supplements to the same groups; expansion of the school meal service; safeguarding national intakes of B-vitamins by addition of thiamin to flour and raising the extraction rate of flour to include as much of the germ as possible; and fortifying flour with calcium carbonate. A key element of the policy was that the main sources of energy, i.e. bread, flour and potatoes, should not be rationed. However, strict rationing of meat, bacon, fats, sugar and preserves was necessary leading to a substantial fall in the per capita consumption of fats and refined sugar. The practical implications of all this were brought home, literally, to the housewife in the kitchen by a widespread programme of education by means of leaflets, radio talks and advertising in the press supplemented by practical demonstrations.

There is abundant evidence of the success of the policy. Maternal, infant and neonatal death rates fell to their lowest levels ever. In spite of the dislocation of family life due to the evacuation of children from the towns and the destruction of housing, the rate of growth of children increased and surveys showed that the prevalence of rickets, dental caries and anaemia declined. Sir Dugald Baird has provided a convincing demonstration that the stillbirth rate actually fell more steeply during the War than in the preceding and succeeding periods and attributes this to better nutrition.

And what of coronary heart disease? After all, the dietary changes which occurred during and after the Second World War included a substantial fall in fat and sugar consumption and an increase of cereals and vegetables. The Southampton Medical Research Council Unit with which I was associated is currently undertaking a vigorous review of mortality trends in heart disease during this period. Unfortunately there are a number of technical difficulties of interpretation due to changes in classification of disease and other problems. All that can be said is that there is no clear evidence of a decline in mortality from coronary heart disease during this period. Whether there was some mitigation of the rate of the increase which had commenced before the War is uncertain.

The success of the national food policy in the Second World War can probably be counted as the most notably beneficial intervention of government in nutrition so far recorded anywhere. This was recognized in an unprecedented manner by the presentation in 1947 of the Lasker Award of the American Public Health Association to the British Ministries of Food and Health. Perhaps it was the magnitude of this success which led once again to the complacency which undoubtedly ensued. In the year the Lasker Award was presented I was a medical student at Oxford. At that time Rudolf Peters occupied the Chair of Biochemistry

and Florey was Professor of Pathology. For most students in Oxford in those days there were no remaining unsolved problems in human nutrition. All the accessory food factors had been identified. All that was necessary was to eat a good mixed diet, preferably three square meals daily, avoid obesity and all would be well. It is true that H. M. Sinclair was at Magdalen College but he, alas, was a voice crying in the wilderness. And yet it can be argued that as great a proportion of illnesses and premature deaths today have a nutritional factor as they did 100 years ago.

This is not the place or time nor am I the person qualified to draw out the threads of the complex skein of scientific evidence which, during the decades since the War, has focused attention of nutritionists on dietary fat, fatty acids and fibre. Moreover, I hope I shall be excused from taking sides in the controversy of whether the ills resulting from a diet unbalanced in fats is due to deficiency of linoleic and linolenic acids or due to excess of saturated fatty acids or both. Whatever the exact mechanisms may be, it is now the view of the majority of scientists that dietary fat is in some way related to coronary heart disease and possibly various types of malignant disease.

For government, these new developments pose grave and novel problems. The scale of the mortality and sickness related to unbalanced diet is too great to be disregarded. However, it is one thing for government to ensure, as was proper in the previous era, that all, in particular the poor and unfortunate, should receive more of life-and-health-giving factors which, in addition, are generally pleasant to take. It is a more difficult matter for it to propose that the consumption of pleasurable but perhaps harmful factors should be reduced, particularly when the employment and prosperity of a large part of the nation depend on the production of these substances. And in any case, of course, there remains a degree of scientific uncertainty about what exactly is needed to correct the errors in the diet.

The report on *Diet and Cardiovascular Disease* (Department of Health and Social Security, 1984), the so-called COMA report, is the latest of a long series of official pronouncements on matters relevant to food policy of which the first was the survey of *Diet of unemployed cotton operatives in the North of England* carried out in 1863 for Sir John Simon to which I have referred. Some of these studies have described surveys carried out by the Department of Health itself or by the Medical Research Council or by contractors, while others have been reviews of the state of knowledge in a particular field by a group of experts. The COMA report comes in the latter category and sets out the almost unanimous views of a panel of ten experts under the Chairmanship of Sir Philip Randle.

The report, in my opinion, is remarkable for its brevity, clarity and balance. Although of the eight recommendations to the general public almost all the panel members would have considered those dealing with the modest reduction in fat as the most important, these are set in the context of a wide range of other advice. In addition there are recommendations to medical practitioners about the identification and management of people at special risk, to manufacturers and distributors of food and to caterers particularly in respect of the labelling of foods for fat and reducing salt in processed food, and to the livestock industry on the

production of leaner carcasses. The next steps will be to translate the scientific advice into information which will permit ordinary men and women to adjust their diets if they so wish and to see that there are a number of different ways in which this can be done, to achieve the labelling of foods so that people have the information on which to base a sensible choice, and to mount a campaign of health education. Like all moderate policies, the recommendations are open to attack from both extremes; by those who regard the suggested changes in diet as insufficient and those who regard the scientific basis for any change as inadequate. For my own part, in view of the gaps in our knowledge and the acknowledged complexity of the issues, I regard the recommendations as prudent and proper, and consider, as the panel cautiously puts it, that the measures, if adopted by the majority of the population, are more likely than not to reduce the incidence of coronary heart disease.

In the final phase of his career John Boyd Orr's interests extended far beyond the United Kingdom and embraced the world. Let us hope that 40 years after his work on the foundation of the Food and Agricultural Organization he is not aware in some other sphere of the dreadful tragedy in Ethiopia and other parts of Africa. Taking a global view we may doubt whether much practical progress has occurred since Pharaoh's day. What has advanced, however, is our understanding based on science of the mechanisms, including the relations between food and health. This confers on us all a much greater responsibility.

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